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I

GEOLOGY IN A COLLEGE COURSE[1]

I have in mind a college beginning course in geology, of fair length, accompanied by field and laboratory work. I become the more convinced of the necessity of field and laboratory work in such a general course, the more I see of the confusion of even good textbook students when confronted with actual simple structures and processes in the field. What I have to say applies with almost equal force to the college course in physical geography, given under the same general conditions as those indicated for the course in geology.

I am forbidden by the limitations of my subject from doing two things. I may not consider those values which geology has in common with other sciences or with other non-scientific disciplines; but only those peculiar to geology itself. Nor may I consider those values which arise rather from the teacher and from his method of presentation than from the subject. I will add, however, that the character of the teaching is of even more importance than the nature of the study. The educational value of geology, as of all other branches of learning, depends on a teacher who has enthusiasm, a first-hand knowledge of the subject, a method which permits no sloppiness of thinking or of statement, and a willingness to stay with the job till it is done. Geology itself is not only valuable, but interesting; if it is not made so to the student, it is the fault of the instructor.

[1] Read before the Section of Mathematics and Science of the Ohio College Association, at Columbus, Ohio, December 29, 1909.

THE PRACTICAL NATURE OF THE SUBJECT-MATTER OF GEOLOGY

Geology is fortunate in that it deals, to a very large extent, with matters of practical everyday concern; if you please, with matters of commercial concern. Doubly fortunate, for, in the first place, there are more likely to be points of contact with the student, so that the subject is more interesting; and second, the study of geology thus gives the student a knowledge of many matters which may be later of direct use to him. It needs only to enumerate some of these subjects: the origin and mode of occurrence of deposits of metallic ores; non-metallic mineral products, such as fuels (including coal, oil, and gas), building stones, clays, etc.; soils, their relation to the underlying rock and their geological origin; shore work, including bar formation and the processes, natural and artificial, which have to do with determining good harbor conditions; the geological conditions which determine the occurrence and quality of our water supplies. The list could be very largely extended. The fact that all civilized governments, and in our own country almost every state, has or has had geological surveys, shows the eminently practical nature of the subject.

It is in order to protest against the disparagement with which some educators refer to "useful" studies; against the attempt to classify studies as "cultural" or "useful," with the implication that the "useful" studies are without cultural value. Do they mean to tell us that uselessness is the mark of genuine culture? For my own part, I deny that any study has cultural or educational value which is not useful. But useful for what end? Not certainly for coining a few additional dollars; but serving directly to relate a man to his natural or human environment. Greek philosophy and literature are useful when they put a man into relation with a body of knowledge which is helpful in living. When they fail to do this,—when the study of Greek turns from literature to grammatical drill; when the study of any literature fails to bring the student into such contact with great books as to mold and change his own life; when philosophy fails to help the student to a philosophy of life of his own, these studies cease to be useful; and, at

the same time and for the same reason, cease to be educational. The same standard should be used for science in general and for geology in particular. Geology must be useful to be of value. It must relate man to his environment. Not, of course, in the same way as do the other studies mentioned; for then there would be no need of both. But in its own way it should contribute its part to the educational process.

A word of comment on the emphasis which textbooks, especially geological textbooks, place on the different divisions of the subject. In a systematic presentation of the results of a science all divisions of that subject must find a place. Yet to a greater extent than in even the more recent texts, the emphasis should be put on those subjects which have practical value. Soils and underground water are things upon which all should be informed; and they are just as capable of scientific treatment as geysers and Devonian fish. And students would profit, when they come to historical geology, by a long stop on the periods represented in their own districts, rather than by taking a uniform pace thru the repeated details of all of the great geological periods.

GEOLOGY DEALS WITH THE "EARTH AS THE HOME OF MAN"

An old idea regarded the earth as made for the occupancy of man. When the stage had been prepared, the curtain was raised, man was led in, and the action commenced. Today we look at man's relation to his environment in a different way. From the point of view of evolution man has been long on the earth; his early history merges into that of the animal kingdom whence he arose; and from the beginning, both in pre-human and in human stages, there has been a steady adaptation to the physical environment; an adaptation which is being constantly renewed and enlarged in our complex society. The larger part of this environment, the more fundamental part, is inorganic; and with the explanation of the inorganic environment geology primarily has to do. The distribution of continent and ocean; of plain, plateau, and mountain range; of stores of metal and of fuel;—these are some of the elements of man's complex environment. These factors

were somewhat important during savagery and barbarism. They determine today in civilization areas of close or sparse settlement, the location of production and manufacture, and of lines of transportation. Neither history nor economics can be fully understood if such factors are not taken into account. If man is ever fully to know himself, it will be only when he also knows the environment with which he has grown into such close and delicate adjustment. And a large part of that environment it is the province of geology to explain.

GEOLOGY AND THE ESTHETIC APPRECIATION OF NATURE

Science deals with abstract conceptions of phenomena and with their order of occurrence in space and time. The esthetic appreciation of the concrete in nature finds small space in our presentation of the subject. Yet I venture the suggestion that to the appreciation of nature the college course in geology has and should have somewhat of importance to contribute.

When I stand on the Gorner Grat and see, across the glacier that flows at my feet, the line of mighty peaks which, from Monte Rosa to the Matterhorn, forms the boundary line between Switzerland and Italy, I get not less but more satisfaction because I know that these summits have not always shown their present contrast of blackened rock and dazzling snow; that there was a time when they were without glaciers and more like our own White Mountains and Adirondacks. I get no less satisfaction because I know that these snow fields and glaciers which have changed the earlier massive and perhaps forested shoulders and summits into the present complex of horn, and knife-like edge, and glacial amphitheater, will, if they continue their present work unchecked, truncate the range and become the agents of their own destruction.

I, as a student of geology, have an enjoyment in the landscape which my friend without my geological knowledge lacks. I have his appreciation of form and color, of sky, cloud, and woodland, of hill and valley. But beyond this outward acquaintance I have that knowledge of the land's structure and history which enables me to reduce the confused appearance of the landscape to a few fundamentals, to catch that unity

in diversity which he fails to see. Nor need my appreciation of the landscape be marred by my knowledge of geological detail, any more than is the sculptor's appreciation of the human form by his intimate knowledge of muscle and bone anatomy. I *can* rise from a mechanical to an esthetic appreciation of my environment, an appreciation the more real because more intelligent than that of my uninformed friend.

It is unfortunate that the term nature study, like the related term naturalist, seems in the process of becoming limited to the study of organic nature. For the large outlines and much of the detail of our physical environment are not organic, but inorganic. We are tending to a partial understanding of nature. It is unfortunate that we do not come into a more sympathetic relation with our inorganic environment;—with the changing and intelligent "Face of the Earth," to use the expressive figure of Suess.

I can easily understand that some may see in the suggestion just made an opening of the door to a mushy sentimentalism. Science, they say, deals with facts, and has little use for that soft subjectivism which so often parades under the name, and dishonors the cause, of literary criticism. I admit the possibility of such an outcome but deny its necessity. I see no reason why we should not go on to clothe in flesh and blood the dry bones of our completed results. The question of Ratzel is pertinent: "Are we not as justified," he asks, "in our desire to know how the completed coral island or fiord stands in nature, as in wishing to understand the structure of the former and the method by which the latter was hollowed out? And who is better fitted to draw for us this picture than the investigator who, while working out the details, must so often have seen it as a whole? Were it not a loss, even for his science, if he did not sketch this completed picture which he sees before him?"

MENTAL VALUES TO BE OBTAINED FROM GEOLOGY

When I come to speak of the peculiar mental qualities developed by the study of geology, rather than of the value of its special subject-matter, I do not feel quite so sure of

my ground. But I would suggest that along three lines at least, new mental attitudes may result.

First, the student may develop enlarged ideas of space and time. Of space: From the study of single processes at work in his own neighborhood, the student goes step by step to the study of the earth as a whole. Nor can he stop there; for the earth is not an isolated body, but a single member of the solar system, and its history is a part of the history of that system. And our most recent and best college text-book of geology has a chapter in which it goes beyond the sun to the origin of the system itself from the parent nebula. To be sure, geology here trespasses on astronomy, and the subject is highly theoretical. But it constitutes a part of geology, and the geologist is liberal when he decides what to include in the history of the earth.

Of time: There is an equal enlargement of the student's mental horizon, so far as time is concerned. "In the economy of the world," said Hutton, "I can find no traces of a beginning, no prospect of an end." Today, as then, we can see no prospect of an end. We do find traces of a beginning, but so far back that repeatedly continental surfaces have been reduced to lowlands by the slow processes of stream erosion. The large results of processes working slowly thru long periods of time is one of the lessons of geology.

I believe the student may get from geology a conception of the immensity, both spacial and temporal, of the physical environment. If this drives him, in self-defense, to a philosophy of life which makes spiritual forces mightier than material, this, too, might be credited to geology.

Secondly, there comes to the student the idea of changing geometrical conceptions. Geology deals with an ever changing world. Fixity is unknown, whether we deal with surface features, continental blocks, or the form of the earth as a whole.

Geology deals with matter in three dimensions, whether we are considering a sand dune, a river valley, a limestone formation, or a mass of intruded granite. It therefore requires a geometrical imagination.

Further, it deals with these two conceptions at once, requiring a changing or progressive geometrical imagination. Let me illustrate. I have in mind one of the narrow ravines bordering our central Ohio rivers. To realize it requires a geometrical conception of a rather complex character, since it becomes shallower and varies in form from mouth to head. But this is not all. Processes of change affect its bottom and sides. I must see it growing headwards, developing side valleys, widening its bottom lands and flattening its side slopes—that is, I must conceive it as but a stage in a development which I must figure to myself in its entirety. This requires what I call a progressive geometrical imagination. Geology furnishes countless illustrations of problems in which the same quality of imagination is required. I know of no other discipline which requires this quality in like degree. In its demands upon this kind of imagination I believe that geology stands unrivaled.

In the third place there is the breadth of view which the student acquires from considering the interdependence of geology and the other sciences. Geology is the history of the earth. There is a sense in which it is not an independent science, but an application to the study of the earth of principles derived from the other sciences, primarily chemistry and physics. In working out the history of the earth the geologist constantly finds himself compelled to borrow also from botany and zoology, for not only have living beings been agents of rock formation, but their occurrence within the rocks witnesses to important physical events and changes. We have already seen that geology encroaches on astronomy.

In fine, geology is the greatest borrower among the sciences. The sharp boundaries which the beginner so often imagines between the sciences here simply do not exist. The interconnections of the sciences become more evident than the barriers. When I consider the absolute unwillingness that many a student has to admit that what he learns in one department has any application in another; his belief that there is no interrelation of Latin and English, of philosophy and science; I am glad that there is one department where the very nature

of the subject-matter compels a different attitude. He may begin to suspect that all knowledge is one, and to find the reason for it in the fact that we are in a cosmos and not a chaos.

CONCLUSION

I have tried to suggest the special educational values which belong to the science of geology. I hope I have not conveyed the impression that geology has more to contribute than other departments, or that its contribution is of greater value. For I do not think that such is the case. As our human environment is more important than our physical environment, I believe that literature, philosophy, and history have a more important contribution to make than has physical science. And yet, since our physical environment is just as real as our social environment, physical science demands a place in the education of any broadly cultured man. And geology, among the sciences, has a contribution of its own to make, a contribution which can not be made by any of the other sciences; and an essential contribution.

LEWIS G. WESTGATE

OHIO WESLEYAN UNIVERSITY
DELAWARE, OHIO

II

VOCATIONAL SUBJECTS IN THE SECONDARY SCHOOL

In an article in the June, 1909, number of the EDUCATIONAL REVIEW, Mr. George Archibald Clark of Stanford University, writing under the heading "Commercial branches in the high school curriculum" in referring to commercial and industrial work in secondary schoools, makes particular mention of such subjects as commercial arithmetic, commercial geography, penmanship, etc., as being essentially elementary in their character and further goes on to say that in his opinion commercial branches are receiving undue attention in the high schools and that they should be entirely confined to the grammar-grades or only given in the high school as a subdivision in connection with some other subject.

As a teacher of considerable experience in teaching these and other subjects I can not agree with this opinion, nor does the consensus of opinion of the men and women engaged in teaching these branches favor such a view; neither would it seem, in view of the facts hereafter presented, that undue prominence is being given them in the secondary schools or that they are receiving credit to which they are not justly entitled. In fact, to the contrary be it said, that judging from the demand that is being made on the schools by the business part of the community, banks, railroads, mercantile houses of different classes—in fact, by all those in need of youth qualified to take their place in the great workshop of life, and further from the resultant attitude of school authorities in general and the recognition that is being accorded commercial subjects by the colleges and universities in the matter of credits when offered by students for entrance to these institutions, even tho this recognition has been somewhat tardy in the United States when compared with what

has been done in the same direction in European countries,—the conclusion is forced upon us that the horizon of commercial education is steadily expanding. And this is just and right because any subject that in the hands of its possessor is a tool for the better accomplishment of the tasks he finds before him, has proved itself worthy of a place in our modern scheme of education. That this is true of commercial science and that these subjects have made good, witness the continued and ever increasing demand of the school patrons and its reflection in the curriculums of our own and foreign schools.

Mr. Clark tacitly admits the benefits of the practical subjects, in the estimation of the general public, when he says that "The development of the commercial and industrial side of the high school's work has been in deference to the urgent demand of recognition of the claims of the prospective young business man and woman on the attention of the high schools." In this connection it is a well-known fact that, at least in the earlier days of their introduction, most of the business and industrial subjects were very generally either actively opposed or at best given no encouragement by the teachers and authorities of the secondary schools, and were only given trial when a majority of the tax-paying patrons of the schools demanded it. This evidence tends to show that they were subjected to the severest criticism and repeated tests on the part of these same school authorities and, had they possest inherent weakness or failed in their claim of showing results in the lines they cover or proven inapplicable to the affairs of the community, they must inevitably have been found wanting and long ago discontinued.

Again, to deprecate the usefulness of industrial work in school, the statement is made that "the boy who is to take up a trade or to enter any other manual occupation must begin his apprenticeship at or before the high school age." In this connection I would say that in the case of the boy who on account of stress of circumstances is compelled to become a wage-earner at the earliest possible moment, and who in consequence leaves school before or at the high school age, generally fourteen, it might indeed be a fortunate thing,

were it the easy matter here inferred, to begin as an apprentice. When, however, we come to examine the conditions as they actually exist we find comparatively few are able at this age to gain permission to serve an apprenticeship. The boy is too young and immature to be desirable as an apprentice, and employers will seldom take one under sixteen or seventeen years of age. He can not enter an organized and even fairly skilled trade, therefore he naturally follows the line of least resistance and enters a non-skilled vocation, where generally he fills a menial position the remainder of his days. According to government reports there are every year in the United States hundreds of thousands of children coming from the grades to face these conditions. Even in the case of those who are able thru an apprenticeship to get the training fitting them for a trade, we know that practical experience, while invaluable, is by itself a slow, wasteful, and in the end generally a costly method of acquiring knowledge. The better way is the combination of experience and a thoro study of principles. This can best be accomplished in a school where a proper balance is maintained between study and practise. It is just for this reason—namely, to save the boy the long and tedious term of apprenticeship—that our high schools and others are giving the training in the things that will help him to take his place in the ranks of the employed, and this is being done in a far better way than his apprenticeship with its narrowing influences could possibly do.

Mr. Clark at the beginning of his article gives statistics to the effect that not more than five per cent. of pupils entering the public schools afterward attend high school. While exact figures are scarcely available, yet the highest authorities[1] estimate that, taking the city schools, from whose ranks the trades are largely recruited, and outside the rural districts, where a large proportion of the school children stay on the farms, about seventy per cent. of those entering the public schools remain until the age of fourteen, forty per cent. stay till the last grammar-grades; while of those who finish the

[1] Quoted from Professor E. L. Thorndike in a report issued by the United States Commission of Education.

grades, two-thirds enter high school, but nearly forty per cent. of this number drop out before the second year, leaving about thirty per cent. of those entering to graduate from the high school. At the present time the problem would seem to be to keep those coming to the high school long enough to benefit them, because the proportion of withdrawals during the first year is alarmingly large, principally, it has been pointed out, on account of the schools failing to give to a large number of pupils instruction of a kind to meet their needs and interests. Here then is the problem, likewise the opportunity, which is presented to the high school to prove its usefulness to a larger degree, to get close to the needs of these young people by meeting their requirements, and to carry them over the dangerous years which lie between the time of their finishing the grades and the time when they are able to choose their future work. That our high schools are earnestly endeavoring to meet the needs of all, we are certain; that those preparing for college generally are well cared for, we will admit; but that there are great numbers of pupils whose needs are real but whose inclinations are towards business and industrial lines, and for whom suitable instruction is not provided, I think no one will deny. These the high schools must serve by giving adequate courses; if not, their usefulness will be minimized and other schools of an industrial and vocational character will come forward to claim the work as theirs. Already great strides are being made in the direction of practical education thru our high, trade, continuation, and other schools, and gradually is being removed the reproach that has been ours on account of the fact that perhaps over half of America's skilled mechanics, and a far larger proportion of those filling the higher technical positions, are of foreign training.

Coming now to a consideration of some of the commercial subjects discust by Mr. Clark, he says that "arithmetic, whether it has commercial prefixt to it or not, is a grammar-grade subject." This I may say is not borne out by the facts as gathered thru experience or observation. That arithmetic may be begun in even the lower grades with advantage goes

without saying, but that advanced commercial arithmetic, dealing as it does with the more complicated mathematical side of business affairs, is by no means a grammar-grade subject is equally true. From its technicalities and the rapidity with which the arithmetical processes must be applied to meet the exacting requirements of the business office, it is a subject worthy of the mature and trained mind. In fact, it requires a maturity of mind not to be found in pupils of the grammar school age. As well might we say that because the child is instructed in the rudiments of his mother-tongue when of grammar school age, that the study of expression should be discontinued at that stage of his development. He says let us "cut out" arithmetic as a separate study, because it is related to and correlated with bookkeeping. If this is sound reasoning, I would ask then why should we not extend the list and eliminate grammar, composition, and rhetoric, as separate courses. They are all but a means to an end, subordinate to and correlated with the finished product of expression, the written or spoken thought. Or, again, why waste time in the formal study of such subjects even as algebra, geometry, or trigonometry, when they are only preparatory to, and form an integral part of, other subjects such as surveying or engineering. To be consistent let us "cut out" these unnecessary correlated subjects, and get them as need for their principles arise along with the practise of surveying or in the workshop. Such a scheme might even possess merit, but the time then should be extended so as to include at least the greater part of the time now given to the subjects as a whole. Only, as has frequently been pointed out, there is certain to be a great waste of time and energy when instruction is given in a number of subjects at the same time, even tho they be dependent one upon another and closely related in their character. But when, as proposed by Mr. Clark, they should all be given in the time now devoted to one, it means slipshod instruction in all and thoroness in none. In fact, it is entirely opposed to the modern trend in education, which is to divide and specialize. By specializing is meant doing a thing or some certain phase of it completely, and

when applied to a study means getting all out of the subject that it is capable of giving; and it is for this reason that practical subjects, and in fact all subjects, when given with a view of fitting the student for the active duties of life, on account of the fact that their value and usefulness may be measured by the application made of them, must be given with a thoroness unknown to a subject given only for what is frequently spoken of as its cultural effect.

I heartily agree that the young person destined for a business career should of all others get the best that the school has to offer, and all subjects should be given attention which will have a broadening and enlightening influence, inasmuch as time will permit, but to discriminate and say that certain subjects make for high ideals, honorable conduct, etc., simply because they are non-utilitarian, and to designate vocational subjects such as bookkeeping, shorthand, and other practical branches as lacking in these qualities, is to ask us to accept ideas long since exploded, in fact, to return to the deadwood of an age that is past when a subject to be considered educational had to prove its inapplicability to anything connected with the needs of everyday life. Educationally we have advanced beyond this stage, and have surely come to realize that utility in no way lessens the educational value of a study but that it may have an application to present-day affairs and yet do all that any subject can towards inculcating in the student a right attitude towards life in general.

Such being the case, surely then we would be making a great mistake in following the suggestion of Mr. Clark to omit from our high school course a subject of such general importance as commercial geography; a subject that has for its aim the consideration of the whole earth in its relations to man, and that enables us to observe and measure his response to physical environments. Its significance is evident when we reflect that upon a comprehensive grasp of those principles, facts, and forces with which commercial geography is so largely concerned, depends the advancement or inefficiency of a nation. This is true because by its aid we are enabled, by a consideration of the forces that can be seen in operation at the present,

to form some reasonable estimate of the future course of commercial development. As an illustration of what the scientific application of the laws of commerce will do towards solving the practical problems of a nation, we may with pride point to the United States. This country has a population scarcely one-fifth that of China, yet by taking advantage of inventions and appliances and with its experts in all lines developed thru a scientific division of labor, as a result has a productive capacity outranking that of the latter country. Another modern instance that may well serve as an object lesson in this respect is Germany, which largely on account of the attention given in its schools to the critical study of the world field of commerce, of adjustment to environment, and the harmonizing of its own commercial and industrial activities to the conditions existing elsewhere, has far distanced every other European nation in its industrial development. Is a subject of such scope and importance to be confined to and finished in the grades? I think the answer is clearly given when we find it in the courses of all classes of schools ranking from grammar to university.

Regarding the history of commercial branches in the public schools, Mr. Clark goes on to say that "the high schools have borrowed their commercial course from the business college" and that the teachers of these subjects have had no academic training fitting them as teachers. In this connection, while personally having no inclination to question the value of the college or university training, I would, however, call attention to what seems pertinent and that is that many of the departments of commerce in the higher institutions seem to be making a virtue of the fact that for their courses intended to prove especially acceptable and valuable to those wishing to engage in the business professions they are engaging for their lecturers practical experts, men who have had practical experience along the lines in which instruction is sought to be given and who have attained success in their respective lines, notwithstanding that probably in a majority of such cases these men got their knowledge and training not in a college, but in the school of experience. Seemingly they believe that the best

teaching ability is not necessarily gained only thru theoretical knowledge gotten in school but as well thru first-hand knowledge acquired by actual contact. This may explain why many teachers coming from business colleges make such excellent instructors, even tho they may never have received formal pedagogical training. Their work is vitalized because of the fact that in most cases they have themselves served time in the same or similar offices for which later they are preparing their pupils, and because of the necessity that exists in that class of school for pleasing their patrons they have gained the ability to keep in close touch with the interests of the community they serve.

I have previously called attention to the attitude of educators generally to show that practical subjects are now everywhere deemed of the greatest importance, and as further proof of this let us examine a few representative schools to see what they are doing in the matter; such schools, for instance, as the New York High School of Commerce, Jacob Tome Institute, School of Commerce, Central High School, Philadelphia, Pa., and numerous others. I name these schools not so much to point out that they are giving commercial work; that they and practically all of the high schools are doing so every one knows; but what I would call especial attention to is the fact that not only do we find commercial arithmetic, commercial geography, and other commercial branches in their courses of study, but that these subjects are often given in the third and fourth years, showing conclusively that the best schools consider these branches of a character better undertaken by their maturer pupils. Instead of viewing with alarm the fact that such a large number of schools are giving commercial and industrial training, I would point to it as indicating the progressive educational tendency of the times; a tendency that while giving due attention to the fundamentals, yet recognizes that on account of the specialized condition of modern society our school problems are becoming more complex, and in order to meet these conditions and to prove adequate to the task of fitting all pupils for the active duties of life, it is the duty of the high school in as large measure

as possible to give consideration to the probable occupation of the individual.

Coming now to the higher institutions, we find a long list of colleges and universities giving instruction in subjects pertaining to commerce, and as in the secondary schools, if the courses extend over only a single year, generally they are given in the upper years or even as post-graduate work. The University of Wisconsin gives instruction in commercial arithmetic and commercial geography, and in the University of Michigan they are given in the third and fourth years and also as a post-graduate course. They are also found in the upper years in the New York University School of Commerce, Accounts, and Finance, University of Chicago, Amos Tuck School, in Harvard as graduate, in the University of California, and many others. Is it necessary to go from home to the European centers of trade? Should we do so, we find the commercial studies everywhere recognized and given prominent attention in numberless secondary schools, and among the higher institutions of commercial education such as those at Leipzig, Aachen, Cologne, Frankfort-on-the-Main, Antwerp, Paris, London, everywhere we find these same subjects, commercial arithmetic and commercial geography, among the other subjects given, and in many instances they are continued thru the greater part of the four years' university course.

In view of what has been said, I think it is needless to point out that the writer of the article referred to altogether overlooks among others two very important facts: first, that while the elements of a subject may be studied with profit by pupils of tender years, yet that same subject may well be made one of intensive and critical study by the mature mind, and second, that any subject that has a direct bearing on live problems and that is capable of being made of practical application and a tool at the service of its possessor, is one deserving the time and attention of those wishing to prepare themselves for useful citizenship, and therefore is possest of qualities of the truest general and cultural value.

THORNTON H. LODGE

THROOP POLYTECHNIC INSTITUTE
PASADENA, CALIF.

III

THE CASE OF GREEK AGAIN

The author of "The case of Greek" in the June, 1908, *Atlantic monthly* has written a much fairer statement of the real condition of things than usually comes from the pen of a scientist. When a Greek and a scientist talk in favor of their respective subjects, the conversation is apt to become heated, to say the least, and no result of real benefit accrues. But with pen in hand one has a better opportunity to marshal his arguments in proper order and must perforce look at the matter from both sides, if he is to obtain a hearing from thinking men.

We may say that Mr. Kellar makes three points, (1) That all studies are cultural, (2) That the modern languages are, if not alone, at least in groups of two, equal in cultural value to Greek, (3) That a student by the end of his college course can not read Greek.

Being a devotee of education rather than of any one subject of study, I have no quarrel with the statement that all studies have distinct cultural value. The wider one ranges in all fields of learning the better man he should be. Tho personally I am at present more interested in the study and teaching of languages than of sciences, this has come about by accident rather than design; for the sciences which I studied in college were found to be very interesting and I would not today be without the slight knowledge of them thus gained. Having no intention of following any particular profession after graduation, I pursued all studies merely from a sense of pleasure, not with any idea that they would be practically useful in any special calling. In the light then of past experience I would heartily indorse the statement that all studies are cultural in their effect.

A man should not be a narrow specialist. If he is, he becomes that species of bore who can think and talk only of

his specialty and can not see the beauty which lies all about him in the world of nature and the lives of his fellow-men. And yet the question of degree in the matter of culture is one which is open to debate, and if called upon to cast my vote as between science and language, I should cast it for language. My reason would be that the study of man is of more value to man than the study of nature. Of course it may be said that man's life is bound up with his environment and with his thought about it. This is true, which is the reason that the study of nature is valuable. But if in any scheme of study we arrange the subjects in the order of precedence, placing the greatest emphasis upon that which is the most important, and putting the others in subordination to it, we should place the study of man and his history at the top. This study is, of course, possible only thru languages and their literatures.

But at this point comes in the old question of translations *versus* the originals. Why spend so many years in learning foreign languages when it is possible to read their literatures in translations? It is true that half a loaf is better than no bread. If one has not the time to give to learning foreign languages, he can still gain much in the way of thought by reading translations, yet at the same time he will lose not only the benefit which comes from the study of languages other than his own, which is a valuable mental process, but he will lose as well the flavor which is imparted to the literature by the language in which it was originally written. A translation is at best an interpretation by the translator, and it is this interpretation which the reader of translations gets. And, in spite of the fact that the translation may conceivably be a better one than the reader can make, he still loses the benefit which comes from a first-hand knowledge of the translated work. Any one who has read a work in a foreign language and a translation of it in his own tongue feels the difference at once. There is much in the original which can not be carried over. As some wines are spoiled by transportation, so literature loses much of its flavor when transported from one language to another. In the words of Moritz Haupt: "The first stage

is to learn to translate; the second, to learn that translation is impossible."

Mr. Kellar thinks that much of the adulation bestowed on foreign languages and literatures is due to the glamour of the new and strange, and that the greater their antiquity, the greater the adulation which distorts the vision, hiding what is sordid and mean, and investing all with an ethereal light. This is, of course, true, but only in the first stages of our study. As our knowledge increases, words and the ideas connoted by them are differentiated with increasing exactitude. A horse is a horse, whether you call him horse, cheval, Pferd or ἵππος. If you wish to degrade him to nag or raise him to faithful steed, you can do so in any language.

That modern languages, if not alone, at least in groups of two, are equal in cultural value to Greek, is a statement which we teachers of the latter often hear in these days. In my day students who did not study Greek in college were ranked as "specials," were looked down upon by the others as taking an easy road, and did not get a B.A., which was the only degree our college gave. But that has been changed so that now one can get a B.A. for almost any kind of a course. It is the Greeks who are now thought peculiar, not because they are taking an easy road, however, but because they are willing to follow one which is roundabout and but little used.

To my way of thinking Greek is on the retiring, if not the retired, list for two reasons, impracticality and difficulty. The shorter of two roads, especially if it seems to be the more level, is the one which is generally chosen. It seems to be the more practical. You may tell the traveler that the scenery is finer by the other and that he will get more exercise in traveling it, because there are heights to be surmounted. Yet he is apt to reply that what he wants is to get to his destination, and that he will probably get all the scenery and exercise he cares for by the level way. This, I think, is the present view of the case. To tell one to study Latin and Greek first and then learn his modern languages is to tell him to take the longer road, by which he will obtain the finer scenery and the greater exercise. The traveler by the shorter way will

learn French and German, the traveler by the longer Latin and Greek, in addition to the others, which he will acquire easily and rapidly, because of what the older languages will have taught him.

It my be said that there are so many things which one wishes to know that one must choose among them those for which one has time and which will aid him most in after-life. This is true. As there are more things to study than one has time for, one should be very careful to choose those which are best worth knowing and which will be most useful to him. And it is on this basis of worth and usefulness that our discussion must be carried on. But this does not seem to be the place to discuss the question *in extenso;* for it is a long story and has been gone over frequently. Suffice it to say that usefulness is a point on which too great emphasis has been laid in this sense, that the usefulness of a subject implies that it can be used. But to come right down to it, how many things which one studies after the grammar grades of the public school does he use in earning his daily bread? Not many, unless he follows some vocation which calls for special knowledge, and this special knowledge can be easily gained. All other studies are pursued only to obtain usefulness in a more extended and higher sense. A man's usefulness does not end when he is able to earn a living. Usefulness is implied in all his relations with his fellow-men, and this is based on character. Character is, of course, partly due to inborn qualities, but more to training. The man who has drunk deeply of the past is better fitted to cope with life as it is and is not led astray by vagaries of thought put forward by persons who, ignorant of what has been tried and found wanting in the past, think that they have been granted new knowledge. It may seem that I have wandered from the point. I think not, however; for I have been pointing out the way by which this question must be approached. Looked at in this way, the preeminent cultural value of Greek is clearly seen. It has been the experience of all who have studied the language of Hellas that it is finer in shades of expression than any of the other languages of Europe, ancient or modern. Its litera-

ture is unrivaled by any other and has affected all other European literatures. These are categorical statements, but if their truth is not apparent today it can not be made so by rehashing the proofs which have been put forth repeatedly. If one has not the time to learn Greek, then let him learn French or German, but let him not persuade himself that, in getting the lesser, he is getting the better.

In the third place, Mr. Kellar says that a student, by the end of his college course, can not read Greek. Yes, but it is also true that he can not read French or German. In what respect are these statements true? In this, that, because each department of literature has a large vocabulary which is peculiar to it, he can read only in those departments in which he has been trained. I do admit, however, that a student can learn to read the modern languages more easily than the ancient, and yet the things which make the ancient languages difficult to learn, inflection and word-order, are largely present also in the modern languages, so that the difference is merely one of degree. The degree is not so great, however, as to be prohibitive in the case of the classics, if one cares to learn and is properly taught.

Another reason why the student of ancient languages does not learn to read them as easily as he does the modern is found in the literature which he is required to read. After his beginning-book, the student of Latin reads Cæsar, Cicero's orations, Vergil; the student of Greek, Xenophon's *Anabasis*, Homer. The student of modern languages is kept at short stories, easy dramatic literature, and novels. If the two classes of students were given literature of the same character to read, the student of the ancient languages would find his path easier, the student of modern languages, more difficult. That is, what seems a great difference would be largely lessened if the basis of comparison were the same for both.

When we speak of reading Greek we must remember also that its literature embraces a much greater variety than the literature of the modern language, at least as these literatures are read in college; for German literature generally means literature in Modern High German, while Greek literature

includes Homer at one end and Lucian at the other, and at the same time the student reads works in the Æolic, Doric, Ionic, or Attic dialects, or a combination of some, or all of of them. If the student of German were asked to read not only Modern High German, but Middle High German, Old High German, and Gothic, and not only *Immensee, Die Journalisten, Minna von Barnhelm,* and other works of a similar character, but literature of such range and depth of thought as is read by the student of the classics, we should have a much truer basis for comparison.

It is also true that students do not learn to read Greek because they do not try to do so. Being imbued with the idea that it is not a practical study, they do not go at it with the earnestness with which they attack a modern language. This is so because, whether they say so or not, their aim in studying a modern language is to learn to speak it, which, in their minds, is the test of a knowledge of a language and its usefulness to them. As they know that ancient Greek is not spoken today, they think there is no use in spending much time or effort in learning it. This results in a superficial and inexact knowledge of the subject, which does not lead to a lasting hold on the language. For this reason the student of Greek does not get beyond the point where he can, with painful slowness, translate into English a few pages daily, and these he slowly retranslates to his teacher in class, because the teacher can not be at all certain that, if he allowed the pupil to read the Greek without translation, he would not take advantage of that fact, and run over many things which he did not understand. Yet when we speak of *the* student, we must remember that we are speaking of the mass of students. I have had pupils who could read Greek, because they had applied themselves with diligence and with a desire to learn to do so. We must not, however, think that listlessness is found only in students of the classics. The feeling of a large number of students is aptly characterized by a remark of ex-President Patton of Princeton, "The student says to his teacher, 'You are the educator and I am the educatee. Now educate me, *if you can.*'"

Toward the close of his article Mr. Kellar says, "If it were as easy to learn Greek as German or French, or German and French, many a man would hasten to acquire it." But this does not seem to be the point. We should rather say, ancient Greek being somewhat more difficult to learn than German or French, does the end justify the effort necessary to acquire it? I for one think it does. Would we say that it is not worth the effort which a foreigner must make to learn English, not merely to speak it, but to read its literature? And yet Greek is no more difficult to learn than English, tho the difficulties are not exactly the same in kind.

But Mr. Kellar goes on to say, "The truth is that scarcely any one does learn Greek in college or before," and, "but such potential lovers (of Greek) are not likely to be content with the 'residuum' which, as some defenders of the classics, rather graveled for matter, say, is sure 'after all' to remain in the mind of the student." A truer statement of the case would be, the truth is that scarcely any one does learn x in college or before, putting in the place of x any subject you please. In the case of any study, there is only a residuum remaining in the mind, the residuum being larger or smaller in proportion to the ability and application of the student, and the length of time spent on the subject, plus the method used by the teacher.

At the very close Mr. Kellar says, "The comparative cost of Greek is exorbitant and well-nigh prohibitive. The vital question is: Can it be lowered?" I should not put the question in this form, but probably Mr. Kellar and I have the same thing in mind. As I look at it, neither pupil nor teacher is getting what he wants, namely, that he, the pupil, shall be able to read Greek in the same way that he reads a modern language. In what has been said above, I have mentioned some reasons why the student can not do this, but as yet I have said nothing of the teacher's part in the matter. Looking at the question from our point of view, what do we now teach our pupils to do? We teach them to translate into English, with the aid of dictionary and grammar, whereas we want them to be able to dispense as largely as possible

with these two aids, and to read Greek as they do English. Of course, translation is necessary at first, but as the pupil advances he must become more and more able to drop this. How then shall we teach students to read Greek? Not by doing away entirely with translation, but by using the other means necessary to attain our end, namely, reading aloud, writing, learning by heart and reciting aloud, and speaking. These are indispensable aids in fixing the language in the mind, and by their use one gains rapidly in ability to read with understanding. But when I say speaking the language I do not mean that we shall try to teach our pupils to use ancient Greek in daily conversation. What I mean is that, taking any lesson as a basis, we should continually require them to conjugate and inflect the verbs and nouns, to give the English equivalents of the Greek words, to make short sentences with them, doing all this with closed books. Moreover, as their knowledge of words and syntax increases, they should be asked to describe scenes and incidents from daily life. Of course, we can not do this beyond a certain point. We can not speak of electric cars and telephones, but we can speak of natural objects and phenomena, parts of the house, etc. If the pupil will speak the language to this extent, he will have a hold on it which he can get in no other way, and he will not have a distorted idea of it. *Θύρα* will mean door, not portal.

At this point a teacher of modern languages will say, "You are urging teachers of Greek to do just what we teachers of modern languages are doing." Yes, and we should also follow them in respect of the literature which they give their pupils to read. Unless our pupils are of mature years, we should not, after the beginning-book, plunge them into Xenophon and Homer, but should give them fables, short stories, and biographies in prose, in poetry short poems and complete passages from longer ones, grading the matter read according to the ability of the students. Young pupils can not keep up their interest in long works, the subject-matter of which is too far beyond them, but will read with zest short bits which can be finished in a few lessons at most.

If some such plan as this were followed, the college entrance requirements would have to be changed, but both teachers and pupils would gain thereby. The pupils would take more interest in Greek in the preparatory school, and when they entered college, having a much better hold on the language, they would not need, as at present, to spend much time in drill on the elements. They would be able to read with much greater ease and rapidity, so that in the aggregate we should not lose appreciably in the amount of literature read. When students find that they can really read Greek they will see that it is not dead but living, not in the spoken word, but on the living pages of the great thinkers—the philosophers, historians, dramatists, poets—of glorious Greece.

HAMILTON FORD ALLEN

WASHINGTON AND JEFFERSON COLLEGE

IV

THE INFLUENCE OF MATHEMATICS ON SCIENTIFIC DISCOVERY[1]

A discussion of the influence exerted by mathematics on scientific discovery is of special interest at the present time. It sometimes seems to be the case that the progress of invention is measured by the progress of mathematical investigation; and the view has been exprest that this is one of the real phenomena of our time, and a direct consequence of the great scientific activity of the last century having led to the collection of all the rich surface ore and rendered the mining operations of mathematics necessary for further development. It is well worth inquiry how far this is a true statement of the case.

Are the surface nuggets of scientific discovery becoming rarer? Before the answer to this question can be given, it must be remembered that the gold thus collected is of two kinds. There is invention which adds to the common stock of scientific knowledge, and invention which gives immediately the ability to add to the material resources of civilization—that is, purely scientific invention and purely engineering invention. Despite the occasional overlapping of these two forms of invention, there is a real distinction between them, and where this distinction is plain we should suggest that the answer to the above question is negative in the one case and affirmative in the other. Surface nuggets of the purely scientific variety certainly do seem to be getting more scarce, but purely practical discoveries are to be found just as frequently now as in the past, without any more considerable equipment of apparatus than is afforded by the increased perfection of mechanical facilities. There are, however, a grow-

[1] Reprinted from the Engineering Supplement of the London *Times*, January 19, 1910.

ing number of inventions which, while they have immediate practical interest, are based on scientific foundations, and for the discovery of these the mining operations of mathematical analysis are found to be increasingly necessary.

The invention of the steam engine is an instance of purely engineering enterprise—it owed almost nothing to scientific knowledge, and like Topsy just "growed." The knowledge of the laws of heat flow and heat transformation which we now possess has undoubtedly aided its development, but to its original invention and to the overcoming of the difficulties of operation science brought and could bring little. The rise of the gas engine occurred in a more educated age, and "theory" was able to predict the direction in which success lay and in which it was eventually achieved; in this instance mathematical investigation has been of real service to practical invention. Again, railways at their inception asked little of scientific assistance, but the Brennan mono-rail of today could not exist but for the useful aid of mathematical prediction in proportioning its many parts. This leads to a very important consideration. Huxley used to say, somewhat disparagingly, of the "mathematical mill," that, after all, what you got out of it was only what you had first put in. In a sense this is true, but the statement takes no account of the operation of the important factor "time." There is nothing hidden or occult in even the highest flights of mathematical analysis, and there is no magic about it. It is only a reasoned form of deduction, written in a convenient kind of shorthand. Any piece of mathematical work could be written out as a complete deductive argument in ordinary words, but the expansion of space would be such that a page of mathematics might fill a big volume of "prose." This kind of intellectual shorthand has its chief use in the saving of time; a whole series of deductive arguments and conclusions can be worked out and applied in one-thousandth part of the time they would otherwise require. A difficulty, it is true, sometimes arises because the mathematician, owing to the necessity for making assumptions, etc., can not always put the right mixture into his "mill," and other people may then use the

ground-up product as if it were the genuine article. The remedy for such a mistake as this is of course a sufficient discrimination in applying the theoretical investigations of other workers.

In the engineering world—physics we shall deal with presently—the great use of mathematics is the shortening of the time taken in perfecting invention. Immediately a new member has to be added to a delicate mechanism, a whole series of actions and reactions of parts upon one another is involved, and for ultimate success it is essential that the whole should work together. Mere trial and error might take years of time and more money than the whole invention would be worth, but by the right use of mathematics a prediction can be made of the relative proportions which the parts should bear to one another. In this way the field of search is greatly narrowed and the time taken in searching lessened in proportion. The extent to which mathematics is capable of exact prediction depends entirely upon the precision with which the problem to be studied can be stated in mathematical language. It is the greater ability of the engineers of today to translate their problems into this language that has led to the increasing number of successful inventions.

The chief public feature of the recent movement for a reform in the method of teaching mathematics has been the abolition of the Senior Wranglership at Cambridge. But, important as this change is, much has altered that is still more vital. The spirit that animated the old system of mathematical instruction at Cambridge has had its day and is gone, giving place to one which is in sympathy with the real problems of life. Other centers of instruction have followed this lead, and not a few were in advance of it. It naturally happens in consequence that the mathematical equipment of present-day science students is of much more assistance to them in their investigations than was the instruction which the previous generation received, and we hope that the output of Kelvins and Maxwells will be increased accordingly.

Modern inventors know that the proportioning of the parts of their mechanisms one to another in almost any new in-

vention will bring into play nearly every scientific law known to the educated engineer; and in many cases the range of dimensions thruout which success is even possible is so small that the older method of trial and error would be useless as a means for ascertaining the correct relationship of parts, so that the very existence of the invention is at least as much due to the inventor's mathematical ability as to any other. As regards those discoveries and inventions which are of practical use in the world of engineering, the answer to our problem is therefore that it is just as possible as ever it was for new discoveries to be made without the aid of either science or mathematics. But, in order to work them out properly with the smallest expenditure of time and effort, the use of mathematics is always desirable, and sometimes absolutely essential to success.

Coming now to pure science, one can not but be struck with the apparent ease with which such men as Tyndall and Faraday, during the nineteenth century, produced one scientific discovery after another without the necessity for mathematical assistance, altho the latter seems to have had a premonition of the growing importance of correlating physics and mathematics, as he urges Tyndall in a letter to put his results into a form in which they could be handled by the mathematician; and we find the invention of such instruments as the telescope, the microscope, the spectroscope, the polariscope all owing little or nothing to mathematical assistance. To these instruments might be added the galvanic cell, the Wimshurst machine, the telegraph instrument, and many others, all discovered without mathematics.

During the whole of the nineteenth century the sciences of geology, biology, and chemistry were almost entirely non-mathematical. But a great change is at hand. Geology, by its recently discovered association with radio-activity, has come slowly under the influence of mathematical prediction and analysis. We seem, indeed, to be within range of the possibility of calculating the age of rocks from a measurement of the amount of their radio-activity and of their chemical composition. Should it prove possible in this way to range

the rocks in the order of their age, the whole study of geology will be transformed. In a similar way the age of fossil bones may prove to be ascertainable and a new basis given to the study of biology. Indeed, biology, by reason of this new research and of the brilliant statistical work of Karl Pearson in the field of heredity and evolution, almost promises to become a branch of applied mathematics. Chemistry is receiving a new constitution from Sir J. J. Thomson and the school of workers he has instructed at Cambridge—instruction, it may be mentioned, of a largely mathematical nature. It may not be out of place here to narrate the experience of one who attended his lectures in Cambridge at the time when these matters were trembling on the verge of discovery. The mathematical work was of the boldest and most pioneer type possible. Often the trail was lost and a fresh trail struck which it was hoped would prove to be a continuation of the old one; leaps had frequently to be made, but the lecturer, with the fine instinct of a pioneer, brought his little band safely to the desired goal, and no more than experiment was needed to verify the predictions thus made, as in point of fact it very commonly did.

In the work of pure science, therefore, it must be considered that mathematics is growingly important. It first became important in astronomy, where its field was immensely widened by the great Newton, leading to its crowning success in the discovery of Neptune by Leverrier and Adams. The next great success was in electricity, where Clerk Maxwell, by his brilliant mathematical instinct, was able to predict the existence of those electric waves in the ether which now form the basis of wireless telegraphy. Its latest achievements are the breaking up of the chemical atom, by radio-active action, into thousands of corpuscles, and the endowment of physicists with such infinitely delicate analytical apparatus that fragments of matter millions of times smaller than the smallest hitherto recognizable can now be measured and traced thru the most complicated transformations. At the moment it offers, in conjunction with spectrum analysis, the prospect of a knowledge of the conditions in which one substance becomes converted

into another, with a corresponding simplification of the list of the "elements." Mathematical work is therefore increasingly important and growingly productive in leading to scientific discovery. The scientific country may be said to have now been roughly surveyed almost all over, and the comparatively simple equipment of the scientific pioneer of the past must be aided by the more powerful mathematical methods of analysis which are now available.

In engineering it is not so. Invention can still proceed by the old methods. Thus the invention of the aeroplane owes little to scientific knowledge. Indeed, almost the first fruit of the splendid work of the Wrights is a complete revision of our knowledge of the effects of air pressure on moving surfaces. On the other hand, now that the framework of the invention is secured, scientific knowledge can be applied mathematically to fill in the details of the scheme, and so hasten materially the introduction of flying apparatus as near perfection as is the modern motor-car.

An old controversy is known to have existed between scientific men and engineers as to which were the pioneers and which the followers. There is less life in the argument now that so many engineers are scientific men and so many scientific men delight to play at being engineers. The truth is that neither science nor practise is essentially the pioneer, since the by-product of the one forms the raw material for the other. The unexpected behavior of some new mechanism provides the starting-point for a discovery by the man of science, whose theoretical work in turn frequently forms the basis of some new engineering development.

V

DIFFERENT COURSES FOR ELEMENTARY SCHOOLS

There has been going on for years a persistent effort to enrich the elementary school curriculum. New studies have been introduced and new materials have been continuously added to all branches, with the inevitable result that we now have a congested course of study. So overcrowded has the curriculum become, so overshadowed by details and other considerations are those portions of instruction vital and fundamental, that a reorganization and simplification of the present course of study is, at least in large cities, imperative.

The elementary course of study may be simplified by the elimination of certain branches where conditions will permit, by the selection and use of rich, thought-provoking, and practical topics, by the revaluation of the different subjects, and by correlation. Yet perhaps no means will do more to simplify the present-day curriculum than to provide different courses of study for the elementary school, adapted to the needs of varying districts and of particular groups of children.

Differences in social body

The modern city grows in two ways, by the acquisition of individuals, and by the incorporation of small places. Any city like New York, Chicago, Cleveland, is in reality a union of cities. This joining of various communities, however, in no wise erases differences in population, in interests, and needs. These differences are brought with the community incorporated to become parts of the civic life and social body of the larger whole.

Not only is the modern city made up of a variety of component parts, but within each of these there are centers peculiar to themselves. There are centers of foreign pop-

ulation; people late from the fatherland struggling for a livelihood and earnestly seeking to master a new language, to understand new institutions, and to adapt themselves to new modes of social intercourse and life. There are centers of industrial and commercial workers,—strong, earnest, and persistent,—whose incomes are limited and absorbed on the whole in the maintenance of the home and immediate care of the family. Again, there are centers of the more prosperous who have an increment of income beyond immediate necessities, and who are in position to enable their children to avail themselves of all the educational opportunities provided at public expense, and to secure for them additional educational advantages.

There are also differences in the needs of the social order, in the work men and women will find to do. The social order needs lawyers, doctors, preachers, teachers, men of science, of art, and officeholders, but it takes but 4 per cent. of the breadwinners of our country to do all the professional work of society. There is need of managers for all lines of industry and commerce as well as special workers in these directions, yet relatively few find employment as managers or as industrial and commercial specialists, at most not to exceed 1 one per cent. The great need of our social order is for industrial and commercial workers, that is, the great bulk of the world's work lies in the everyday pursuits, and it is in these or in everyday industrial and commercial activities that 95 per cent. of breadwinners find their life's work and make a livelihood for themselves and those dependent upon them.

Differences in children

As in the social body, so with children there are differences. These may be characterized as internal and external. Among the internal differences are those in interest, taste, and capability. The intricacies of arithmetic are of interest to some, the heroic and human in literature and history to others, whereas art and the activities of drawing and manual training call strongly to others. Some children take readily to liter-

ary and academic work, others to science, while still others are gifted with artistic ability and mechanical skill. The tastes of some lead them toward the professions, of others toward administrative and managing vocations, while still others have a bent in the direction of industrial pursuits and commercial activities. Our present methods of determining interest, taste, and ability are, to be sure, crude, still we are able to discern with reasonable accuracy, and to classify children into groups, according to differences in inclination and capacity.

Among the external differences influencing the educational needs of children are the immediate conditions without the home and within the family. Far too little attention has thus far been given to the influence of immediate surroundings upon educational needs. It is obvious that the educational needs of the child in a district where the streets are well paved and clean, where the homes are spacious and surrounded by lawns and trees, where the language of the child's playfellows is pure, and where life in general is permeated with the spirit and ideals of America—it is obvious that the educational needs of such a child are radically different from those of the child who lives in a foreign and tenement section. It is equally obvious that the educational needs of the child, in the home where a foreign tongue is the prevailing language, where the parents are relatively ignorant of American customs, institutions, and ideals, are different from the one who is born of American parentage and absorbs from birth the spirit of our institutions and life.

The factor making the greatest external difference in children, when considered from the point of view of education, is the financial status of the home, as this determines for a majority their educational destination, that is, whether they are to complete their preparation with the elementary school or will go on to the high school, college, and university. Notwithstanding education is public and free, its direct cost to the parent is by no means small, and in homes where there are several children it becomes burdensome. Indeed, so great is the direct cost of education, and so great is the economic

need of the larger number of homes, that, notwithstanding parents often make sacrifices to keep boys and girls of exceptional capacity at school, the educational life of the majority of children must culminate at the time they can legally join the ranks of wage-earners. In a word, the majority of children are destined, by reason of the economic status of the home, to terminate their education with the elementary school, and it is only the minority that has any immediate hope of attending the high school and college. This being true, it ought to be apparent that the needs of children, destined to terminate their school education with the elementary school, are very different from children so situated that they may continue their schooling in higher institutions.

Unity in elementary education

In a government conceived in opposition to class distinction and special privilege, and dedicated to the principle of equality of opportunity, it is not strange that our system of education should have developed as a unit, the kindergarten leading to the elementary school, this to the high school, the high school to the college, and the college to the university. Nor is it strange that in prescribing one course of instruction for the elementary school to be taken by all regardless of personal interest and educational destination, that it was thought equality of educational opportunity was being guaranteed.

With the development of the materials of culture and the differentiation of the professions, there has come a differentiation of courses in our colleges and universities, adapted to the needs, inclinations, and capacities of different groups of students. Dominated from above a variety of courses are now offered in our high schools, but thru all the years of free public education we have held strenuously to the idea that, if equality of opportunity is to be guaranteed, the course of instruction in the elementary school must be alike for all; we have persistently refused to extend the principle of election to the school of the people.

This false notion of securing equality of opportunity would

not have worked out so badly in its ultimate results had the needs of the majority of the pupils of the elementary school determined its course of study. This, however, has not been the case. The necessity of preparing pupils to enter the academic school above has been the largest factor. For the improvement in professional standards and the raising of admission requirements to higher institutions, and the resulting demand that pupils know more and be better prepared, has reacted upon the elementary school to crowd its course of study to the limit, to make it more and more literary, to make the standards of the elementary school more and more intellectual. The elementary school curriculum of today is in consequence essentially academic in its character, adapted primarily to children of strong mental capacity, and appeals primarily to children of bookish tastes and inclined to the professions. Instead of affording equality of educational opportunity to all, the elementary school by offering but one course of instruction, and this of a literary character, serves the interests of but one type of children and ignores in a measure the taste, capacity, and educational destination of all others, and of those, too, whose needs are imperative and to whom the future holds no further advantages. In a word, what was intended to be a school for the masses and afford equality of educational opportunity to all, has become, in a large sense, a preparatory school for academic institutions and serves well the interests of but the few.

On the other hand, the elementary school, feeling its obligation to those children leaving at an early age and destined to enjoy no further educational opportunities, endeavored, to a certain extent, to adapt itself to their needs and capacities. This would have been well had sufficient practical instruction been added to be of direct aid in early entrance upon industrial pursuit. But this was impossible so long as all were expected to take the same course, whether looking forward to a higher academic institution or to the factory or shop. Under these conditions what practical work was introduced was given an academic coloring and tended to add still further to an overcrowded academic course of study.

Our endeavor to have a unified system of education and to secure equality of educational opportunity thru insisting that all take the same course of elementary instruction has, therefore, culminated in giving the elementary school a complexity of ends to be attained thru the same means and in a corresponding complexity in the means or the course of study employed, and it has culminated in a curriculum of a strong academic bias and poorly adapted to the interests, tastes, capacities, and distinction of a majority of elementary school pupils.

Need of different elementary school courses

That the elementary school may in reality afford equality of educational opportunity, that it may take into account the differences in the social body and the differences in children, it is necessary that a distinction be made between the work of giving children the rudiments of an education and preparing them for a higher academic institution, and the work of giving children the fundamentals of an education and fitting them for early entrance upon life-pursuit, and there is need that separate courses of instruction be provided for the accomplishment of these different purposes.

There are at least three ways of doing this dual work of the elementary school. First, an option may be offered in all grades between two courses, one designed for children who purpose to continue their schooling, the other adapted to the interests and needs of children who, from choice or necessity, expect to complete their education with the grades. A second means is to provide one course of study in the first four grades for all children, and to offer an option in the four grammar grades between two courses, the one designed for those going on, and the other for those expecting to attend no other school. A third means, supplementary to the second, is to organize elementary industrial schools as separate centers of instruction and to provide a course of study, half of which is devoted to the more practical portions of the fundamental academic branches, and the other half to industrial studies and activities.

The second of these suggestions is to be tried in Cleveland this year. Two courses are to be prepared for the four grammar grades: the one adapted to the needs of children of literary taste and going on to the high school, the other to the needs of children looking to early entrance upon life-pursuit. This second course is to be rendered flexible so as to meet the needs of different districts and groups of children thru permitting of a maximum and minimum of time that may be given to the several studies, and may be installed at the option of the principal with the consent of the superintendent, but the selection of this course to be optional with the parent.

The third suggestion is to be embodied in an elementary school for boys and girls who are more than thirteen years of age and not below the sixth grade. The course will be two years in length, consisting of two types of work: academic and industrial, and the time of the school will be equally divided between the two. This school will interest boys and girls to whom the regular course is unduly literary and who are not interested in bookish things, and it will also interest those whose economic condition requires them to leave school early to become wage-earners.

The academic studies comprise: English, arithmetic, and geography-history. The English will consist of spelling, writing, reading, literature, and composition. The arithmetic will include accounts and shop problems. The geography-history will deal with the industrial, commercial, and political phases of our national development as well as municipal studies.

On the industrial side the course will include, for boys, bench work in wood and sheet metal, freehand drawing and design, and mechanical drawing; for girls, sewing and garment-making, cooking and household arts, freehand drawing, design, and construction. Thruout the work will be made intensely practical and be given a direct industrial and commercial turn.

These optional courses designed to meet the needs of children who will probably attend no other schools should, how-

ever, by no means lead educationally into a blind alley. They should give such place to the essentials of the three R's and so emphasize neatness, thoroness, and accuracy in industrial and commercial work that the child completing such a course would be admitted to manual training or technical high schools and be able, by doing a certain amount of literary work in addition, to gain entrance to an academic high school.

It is, then, as we believe, by some such differentiation of the work of the elementary school and some such differentiation of its courses, that the elementary school will in reality afford to all equality of educational opportunity, will be able to adjust its work to the needs of different districts and to the tastes, capacities, and destination of different groups of children, and that a thoro simplification of elementary instruction will be made possible.

WILLIAM H. ELSON
Superintendent of Schools
FRANK P. BACHMAN
Assistant Superintendent of Schools

CLEVELAND, OHIO

VI

THE PROPOSED REMOVAL OF THE ACADEMY OF GENEVA TO AMERICA IN 1794

There is no nation which owes more to Geneva and the illustrious founder of its college than the United States. On the recent memorable anniversary we joined with all nations to which the strong influence of Calvin went in the sixteenth century in paying tribute to his college and the great university into which it has grown. But Geneva on her part, we are sure, is also grateful to us. She remembers, as we remember, that her university might today be ours instead of hers, or as well as hers, and that with but a slightly different twist of history this commemoration might as properly have been held on the banks of the Potomac as on the banks of the Rhone. It is not stone walls, but men, that make a university; and in 1794 the men who constituted this renowned institution, the inheritors and custodians of its great traditions, the president and essentially the whole teaching body of the Academy of Geneva, stood ready to transfer themselves from Geneva to the new American republic. They were more than ready, they were anxious. Fifteen thousand dollars a year would have secured, in Jefferson's words, "the whole institution." Jefferson believed in the bargain. Washington did not believe in it; and the College of Geneva did not cross the Atlantic. We are glad that it did not; but we are glad that when, in its critical hour and its distress, it did once contemplate a change of place, it was to us that it thought of coming.

The year 1789, which witnessed at once the inauguration of the American Republic and the beginning of the French Revolution, was the most pregnant year in modern history. It was almost as fateful for Switzerland as for France and the United States. Everywhere the new spirit began its work;

and in the years immediately following there was a French revolution in miniature in Geneva. I do not know of any other brief contemporary account of it so important as the *Authentic history of the origin and progress of the late revolution in Geneva,* by François d'Ivernois, which was written in London in August and September, 1794, and published in Philadelphia in the same year. Its publication so quickly attests the deep American interest in the event. The copy which I have myself read is the identical copy which was in the library of George Washington. It is a pamphlet of 25 pages. It is one of ten works by D'Ivernois in Washington's library, many of them inscribed upon the title page, "From the author." In 1795 D'Ivernois published in London, in French, a work of 500 pages upon *The revolutions in France and Geneva,* of which two copies "from the author" came to Washington's library. In the same year he published a pamphlet entitled *Reflections on the war,* in answer to Madame de Staël's *Reflections on peace.* About the same time he published his well-known work upon the *State of the finances and resources of the French Republic;* and in 1798 he published a pamphlet on *The downfall of Switzerland,* which is dated at St. James's Place, London. Few men in Geneva had been more active than D'Ivernois in resisting the violent changes in 1792, when Geneva was only saved from France by a force sent from Zurich and Berne; he boasts afterwards of being one of three or four to whom pardon and restitution were refused. We find him at one time in conference at Geneva with M. Genet, sent there from Paris, "the same person," he says in his *Authentic history,* "who has since been in America,"—which latter fact Americans do not forget. In the early approaches of the Directory to the citizens of Geneva proposing union with the Great Nation and pledging important privileges and exemptions, the French authorities, writes D'Ivernois, "had given the greatest solemnity and publicity to their promises by suspending the standard of Geneva by the side of that of the United States of America."

The general political position of D'Ivernois is well indicated

by a brief word in the translator's preface to his *Reflections on the war:* "The author of this answer to Madame de Staël is her countryman, and well known to those who are acquainted with the late transactions at Geneva. The same principles which led him in early life to exert himself in defence of the mixed constitution of his native country, against aristocratic encroachments, on a late occasion induced him to take the same active part in resisting the attempt to substitute an unlimited democracy; and the same principles have made him a zealous admirer of the British Constitution." His feeling when he wrote his *History of the late revolution in Geneva,* in 1794, appears from these words on the last page: "Geneva is lost without resource, in respect to religion, to morals, to the sciences, to the fine arts, to trade, to liberty, and, above all, to internal peace."

Here was an ardent patriot, a great lover of Geneva, in an exile to which no end could be seen, hopeless and desperate. He was one of a great group of hopeless and desperate Genevan scholars. The age of the Genevan revolution, as a recent English writer has well said, was the Augustan age of Genevan literature and Genevan science. Some of the master minds stayed in Geneva, but many fled from the city. Some held high office under foreign governments. Eminent Genevan preachers were scattered over England, France, Germany, Russia, and Denmark. There were exiles like De-Lolme, who went to London, where he wrote his famous work on the *British constitution,* and like D'Ivernois himself, who went to Paris and to London also. What more natural than that exiles such as he, and his fellow-scholars who remained in Geneva, should at such a time cast longing eyes over the ocean to the new republic, where it seemed to the burdened men of Europe that all their high dreams of liberty, equality, and fraternity were being realized, seriously, sensibly, and in order? Who in all the world would lend such men such hospitable ears as George Washington, John Adams, and Thomas Jefferson? Jefferson had known D'Ivernois in Paris, and had great respect, we read, for his character and attainments; and to Jefferson and Adams at once, in 1794, came

D'Ivernois's remarkable proposal. It is fully detailed as follows in a letter from Jefferson to Washington, written from Monticello, February 23, 1795:

The revolution which has taken place at Geneva has demolished the college of that place, which was in a great measure supported by the former government. The colleges of Geneva and Edinburgh were considered as the two eyes of Europe in matters of science, insomuch that no other pretended to any rivalship with either. Edinburgh has been the most famous in medicine during the life of Cullen; but Geneva most so in the other branches of science, and much the most resorted to from the continent of Europe, because the French language was that which was used. A Mr. D'Ivernois, a Genevan, and a man of science, known as the author of a history of that republic, has proposed the transplanting of that college in a body to America. He has written to me on the subject, as he has also done to Mr. Adams, as he was formerly known to us both, giving us the details of his views for effecting it. Probably these have been communicated to you by Mr. Adams, as D'Ivernois desired should be done; but, lest they should not have been communicated, I will take the liberty of doing it. His plan, I think, would go to about ten or twelve professorships. He names to me the following professors as likely, if not certain, to embrace the plan:

Mouchon, the present President, who wrote the Analytical Table for the Encyclopædists, which sufficiently proves his comprehensive science. Pictet, known from his admeasurement of a degree, and other works, professor of Natural Philosophy. His brother, said by M. D'Ivernois to be also great. Senebier, author of Commentaries on Spallanzani, and of other works in Natural Philosophy and Meteorology; also translator of the Greek tragedians. Bertrand and L'Huillier, both mathematicians, and said to be inferior to nobody in that line, except La Grange, who is without an equal. Prévost, highly spoken of by D'Ivernois. De Saussure, and his son, formerly a professor, but who left the college to have more leisure to pursue his geological researches into the Alps, by which work he is very advantageously known.

Most of these are said to speak our language well. The names of Mouchon, Pictet, De Saussure, and Senebier are well known to me, as standing foremost among the literati of Europe. Secrecy having been necessary, this plan had as yet been concerted only with Pictet, his brother, and Prévost, who knew, however, from circumstances, that the others would join them; and I think it very possible that the revolution in France may have put it in our power to associate La Grange with them, whose modest and diffident character will probably have kept him in the rear of the revolutionary principles, which has been the ground on which the revolutionists of Geneva have discarded their professors. Most of these are men having families, and therefore M. D'Ivernois observes they cannot come over but on sure grounds. He proposes a revenue of fifteen thousand dollars for the whole institution; and, supposing lands could be appropriated to this object, he says that a hundred Genevan families can readily be found, who will purchase and settle

on the lands, and deposit for them the capital of which fifteen thousand dollars would be the interest. In this revenue he means to comprehend a college of languages preparatory to the principal one of sciences, and also a third college for the gratuitous teaching of reading and writing to the poor.

It was about three months before the date of this letter of Jefferson's to Washington that D'Ivernois's proposal had been received. John Adams, then vice-president of the United States, received a letter from D'Ivernois at the same time with Jefferson, and at once laid the matter before Washington. Washington's letter to Adams, returning the papers submitted, is dated November 15, 1794; and in it Washington says:

The picture drawn of the Genevese is really interesting and affecting. The proposition of transplanting the members, entire, of the University of that place to America, with the requisition of means to establish the same, and to be accompanied by a considerable emigration, is important; requiring more consideration than under the circumstances of the moment I am able to bestow on it. That a National University in *this* country is a thing to be desired has always been my decided opinion; and the appropriation of ground and funds for it in the Federal City have long been contemplated and talked of; but how far matured, or how far the transplanting of an *entire* Seminary of *Foreigners*, who may not understand our language, can be assimilated therein is more than I am prepared to give an opinion upon—or indeed how far funds in either case are attainable.

While Adams and Washington were considering the matter in Philadelphia, Jefferson was active about it at Monticello. In Jefferson's mind this splendid scheme of D'Ivernois must have awakened echoes of the ambitious project of the Chevalier Quesnay de Beaurepaire a few years earlier. Quesnay was one of the enthusiastic young Frenchmen who came over to America to serve in the war of the revolution; and, to strengthen the relations between France and America, he conceived the idea of founding an academy in America, with professors from Europe, the French language and culture of course dominating. He succeeded in raising by subscription in America for his academy 60,000 francs; and the corner-stone of a building was actually laid in Richmond, Va., in 1786. The published list of foreign associates embraces the names of the most distinguished French scholars of the

time, together with representative Englishmen; and among the supporters is named Thomas Jefferson, minister plenipotentiary of the United States at Paris. Among the associates of the Richmond Academy we find M. Pictet, "citoyen de Genève," probably the same with whom Jefferson afterwards (in 1803) corresponded with reference to removal to Virginia. Jefferson says that he met some of these Swiss professors in Paris. "Undoubtedly," says Professor Herbert B. Adams, whose researches in this field were of such high value. "it was in that polished circle of learned men, within which Quesnay and Jefferson moved, that the latter's ideas of university education began to take cosmopolitan form." The approach of the French revolution involved Quesnay's brilliant scheme in ruin. But the building which he founded in Richmond was the place where the Virginia convention in 1788 ratified the Constitution of the United States; and when Jefferson in 1794 received D'Ivernois's proposal for transplanting the Academy of Geneva to America, it must have stirred his memories of Quesnay's Richmond academy.

In considering the relation of Geneva and its Academy to the United States at the period under survey, it is impossible not to remember also Albert Gallatin, who, born in Geneva in 1761, entered its famous Academy as a student in the very year, 1775, that our Revolution began, was graduated in 1779, and the next year came to the United States, where he was destined to become one of our foremost citizens and one of the most influential of international men. "To a higher degree than any American, native or foreign born, unless Franklin, with whose broad nature he had many things in common," says his biographer, Mr. Stevens, "Albert Gallatin deserves the broad title, aimed at by many, reached by few, of Citizen of the World." Gallatin's family was for generations one of the first in Geneva. Five Gallatins were the chief magistrates of the republic; many were prominent in the Church; and some were professors and rectors of the Academy. Albert Gallatin was in close relationship with the Pictets of Geneva, who are referred to in this paper. In a letter written by Gallatin in 1847 to Eben Dodge, published in Gallatin's *Writ-*

ings (vol. ii, p. 638), we have one of the best existing accounts of the organization and general life of the Academy at the time when he was a student there, as well as a graphic picture of Geneva society at the time. Many distinguished foreigners from Germany and England were then coming to Geneva to finish their education. "Besides these," writes Gallatin, "there were some from America, amongst whom I may count before the American Revolution those South Carolinians, Mr. Kinloch, William Smith—afterwards a distinguished member of Congress and minister to Portugal—and Colonel Laurens, one of the last who fell in the War of Independence. And when I departed from Geneva I left there, besides the two young Penns, proprietors of Pennsylvania, Franklin Bache, grandson of Dr. Franklin, and Johannot, grandson of Dr. Cooper of Boston, who died young. Now, amongst all those foreigners I never knew or heard of a single one who attended academical lectures. It was the Genevese society which they cultivated, aided by private teachers in every branch with whom Geneva was abundantly supplied."

The interest of Dr. Samuel Cooper of Boston here referred to, whose grandson, young Johannot, was at school in Geneva at the time when Gallatin left for America, had been secured for Gallatin upon his coming to America by Mlle. Pictet. Dr. Cooper was one of the most distinguished and influential citizens of Boston, and his influence secured for Gallatin the permission to teach French at Harvard College, in which occupation he remained for about a year. The winter of 1784-5 he spent at Richmond, Va.; this was the very period, it will be noticed, of Quesnay's activity. Gallatin was already corresponding with his friends in Geneva about a large Swiss emigration to this country; and in this connection begins the history of his own long identification with Western Pennsylvania. His log cabin on the Monogahela was the beginning of New Geneva. He was so long silent in the woods that his friends in Geneva were alarmed, and Jefferson, then our minister at Paris, wrote to Mr. Jay for information. This was Jefferson's first knowledge of one destined to become

his conspicuous political associate, admirer, and friend, one with whom he so frequently conferred upon his scientific and educational schemes. At the time of Jefferson's corrrespondence with D'Ivernois, Gallatin was a member of the Pennsylvania Legislature and on the eve of his election to Congress. Ten years before, we find him sending his regards to D'Ivernois in a letter to his friend Badollet. His letter to Badollet, written at Philadelphia, December 29, 1794 (see Henry Adams's *Life of Gallatin,* p. 144), shows his familiarity with the correspondence of D'Ivernois with Jefferson and Adams and his own relation to D'Ivernois's plans for Swiss emigration to America. His interest is referred to by Borgeaud in his *History of the University of Geneva* (p. 612), which gives the fullest reference to the general subject which I have found in the recent works of Genevan scholars. Gallatin's love for Geneva remained warm to the end of his life; and early in 1815, after his services in the conclusion of the treaty of Ghent, we find him visiting his youthful home after the crowded thirty years. He left only one reference to a visit that must have stirred within him such deep feelings; he said that, as he approached Geneva, calm as his nature was, his calmness deserted him. Geneva was proud of him and paid him the highest honor. How peculiarly qualified Gallatin was to appreciate a proposition like that of D'Ivernois appears from his relation in his later life to the scheme for the founding of a national university at New York, to the beginnings of the Smithsonian Institution, and to the New York Historical Society. He was for a generation the chief personal bond between Geneva and America.

The results of Jefferson's exertions in behalf of the Geneva professors are stated in a letter from him to D'Ivernois, dated at Monticello, February 6, 1795.

> Your proposition for transplanting the college of Geneva to my own country [he says] was too analogous to all my attachments to science & freedom, the first-born daughter of science, not to excite a lively interest in my mind, and the essays which were necessary to try it's practicability. This depended altogether on the opinions and disposition of our State legislature, which was then in session. I immediately communicated your papers to a member of the legislature, whose abilities & zeal pointed

him out as proper for it, urging him to sound as many of the leading members of the legislature as he could, & if he found their opinions favorable, to bring forward the proposition; but if he should find it desperate, not to hazard it; because I thought it best not to commit the honor either of our State or of your college, by an useless act of éclat.

He proceeds to speak of the warmth with which many members of the legislature had listened to the proposition, but of the practical considerations of language, expense, and the disproportion of the large plan to the small population, which finally determined all against it. For his own part he says:

I should have seen with peculiar satisfaction the establishment of such a mass of science in my country, and should probably have been tempted to approach myself to it, by procuring a residence in it's neighborhood, at those seasons of the year at least when the operations of agriculture are less active and interesting.

Continuing, he laments the circumstances which had suggested the emigration.

I had hoped [he says] that Geneva was familiarized to such a degree of liberty, that they might without difficulty or danger fill up the measure to its maximum; a term which, though in the insulated man bounded only by his natural powers, must in society be so far restricted as to protect himself against the evil passions of his associates, & consequently them against him.

This thought he develops at length, and concludes:

But I have been insensibly led by the general complexion of the times, from the particular case of Geneva, to those to which it bears no similitude. Of that we hope good things. Its inhabitants must be too much enlightened, too well experienced in the blessings of freedom and undisturbed industry, to tolerate long a contrary state of things. I shall be happy to hear that their government perfects itself, and leaves room for the honest, the industrious & wise; in which case, your own talents, & those of the persons for whom you have interested yourself, will, I am sure, find welcome and distinction. My good wishes will always attend you.

Jefferson sent his letter for D'Ivernois to Adams, to be forwarded, returning the letter from D'Ivernois to Adams himself, which the latter had sent him to read. His own distance from any seaport, and the convenience of Adams's

position, would, Jefferson hoped, excuse his committing the letter to Adams's care; and from Adams the disappointing message went its way to D'Ivernois and the anxious professors at Geneva.

But Jefferson did not rest here in his endeavor to render a service to these Geneva scholars, which he felt would also prove a conspicuous service to scholarship and education in the young republic. He knew that Washington was deliberating on the purpose to which he should apply certain shares in the Potomac and James river companies, the disposition of which had been placed in his hands by the Virginia assembly in recognition of his services in promoting communication with the West. Washington had asked him to think about it; and he now thought about it very actively in connection with the Geneva proposition. He remembered that Washington had thought the endowment of some academic institution the best application of the money; and he wrote to him, in the letter of February 23, 1795, just after his discouraging letter to D'Ivernois: "Should you have finally decided in favor of this, a circumstance has taken place which would render the present moment the most advantageous to carry it into execution, by giving to it in the outset such an *éclat* and such solid advantages as would ensure a very general concourse to it of the youths from all our States, and probably from the other parts of America which are free enough to adopt it." He then outlines to him D'Ivernois's proposal for "the transplanting of the college of Geneva in a body to America," as given above, adding various suggestions as to how the plan would have to be supplemented and changed to meet American needs. Especially he felt that there should be a professor of agriculture, and that this professor should come from no country but England. "Indeed, I should mark Young as the man to be obtained." All these things, however, were "modifications to be left till their arrival here." As D'Ivernois had desired his proposition to be made to the legislature of Virginia, he had there, he said, first submitted it. Failing there, he now, without D'Ivernois's knowledge, turned to Washington, feeling that the latter would never again have so fortunate

an opportunity to apply the revenues whose best use they had been considering together. The new institution might be established in a part of Virginia near enough to the new federal city "to be viewed as an appendage of that, and the splendor of the two objects would reflect usefully on each other." M. D'Ivernois had written that the professors would keep themselves disengaged till the ensuing spring, waiting an answer; but a determination should be arrived at as soon as possible and communicated to M. D'Ivernois, then in London, lest the discouraging letter he had already sent should throw the parties into other engagements.

Washington's reply to Jefferson's letter, which had been delayed in transmission, was dated at Philadelphia, March 15, 1795. "My mind," he writes, "has always been more disposed to apply the shares in the inland navigation to the Potomac and James rivers, which were left to my disposal by the legislature of Virginia, towards the endowment of a university in the United States, than to any other object." In pursuance of this idea, he had recently made certain definite propositions to the commissioners of the federal city for cooperation toward such a foundation in the new capital.

Hence [he continued] you will perceive that I have in a degree anticipated your proposition. I was restrained from going the whole length of the suggestion by the following considerations. 1st, I did not know to what extent or when any plan would be so matured for the establishment of an university, as would enable any assurances to be given to the application of M. D'Ivernois. 2d, the propriety of transplanting the professors *in a body* might be questioned for several reasons; among others, because they might not be all good characters, nor all sufficiently acquainted with our language. And again, having been at variance with the levelling party of their own country, the measure might be considered as an aristocratical movement by more than those who, without any just cause that I can discover, are continually sounding the bell of aristocracy. And, 3d, because it might preclude some of the first professors in other countries from a participation, among whom some of the most celebrated characters in Scotland, in this line, might be obtained. Something, but of what nature I am unable to inform you, has been written by Mr. Adams to M. D'Ivernois. Never having viewed my intended donation as more than a part of the means that were to set this establishment afloat, I did not incline to go too far in the encouragement of professors, before the plan should assume a more formal shape, much less to induce an entire college to migrate. The

enclosed is the answer I have received from the commissioners; from which, and the ideas I have here expressed, you will be enabled to decide on the best communication to be made to M. D'Ivernois.

In conclusion, Washington spoke more definitely than he had hitherto done of his idea of a national university.

The plan I contemplate is to supersede the necessity of sending the youth of this country abroad for the purpose of education (where too often principles and habits unfriendly to republican government are imbibed, and not easily discarded) by instituting such an one of our own as will answer the end, and associating them in the same seminary will contribute to wear off those prejudices and unreasonable jealousies which prevent or weaken friendships and impair the harmony of the Union.

We thus owe to this proposal of the College of Geneva to migrate to America a memorable definition by Washington of his purposes and motives in his effort to found a national university; as we doubtless owe much stimulation to the thoughts which, working on in Jefferson's fertile mind, made him by and by the founder of the University of Virginia.

What further communication Jefferson made to D'Ivernois, or whether he made any, we do not know. We do know that the College of Geneva did not move to America. We are, I repeat, glad of it; we are glad that its life has been identified with no place but the beautiful and historic city where Calvin planted it. But it is indeed an interesting fact that at one critical moment in its life we might have had it for the asking. Had we taken it, another college would certainly by and by, when better weather came, have been organized at Geneva; and presently the controversy as to which was the true college of Calvin would have been as interesting, and perhaps as bitter, as the controversy four centuries before as to whether the true Pope were at Avignon or Rome. We in America should have maintained stoutly that ours was the true one; and the international result of the presence of the University of Geneva as an element in the great American national university of Washington's dreams is a subject for fascinating speculation. We should certainly be sorry had we checked or

hindered the glorious development of Calvin's college from the time of Thomas Jefferson to the time of the recent great commemoration. We can not claim that we were saved from it by our magnanimity. We were saved from it by our youth, our poverty, and the common-sense of George Washington.

EDWIN D. MEAD

BOSTON, MASS.

VII

EDUCATION IN CUBA

A hundred years ago Spanish America had been liberally endowed by Spain with at least higher institutions of education. Cuba was, however, an exception; for until about that time Cuba had in all ways been neglected by the mother country on account of the broader, more inviting fields of adventure and conquest offered by the greater mainland colonies, as Peru and Mexico. Education especially suffered. The rich or well-to-do only received an education; the people none. The few schools were mainly of the Church, and teaching, high or low, was in the hands of friars or parish priests, as in Spain in the Middle Ages. At the end of the eighteenth century the university was practically the only established institution of education.

The opening of the nineteenth century saw some faint governmental effort to improve and establish primary education. This continued desultorily thru two-thirds of the century. It was, however, wholly inadequate, plainly formal, and without real interest. The few schools thus opened were poor, weak, lifeless things that naturally gave little result in general education. They were unpopular, the teachers miserable, poverty-stricken, and without standing. About the middle of the century these schools were found by Captain-General Concha to accomplish almost nothing. The instruction with which students were then coming from them to the university led this officer to establish the provincial "Institutos de Segunda Enseñanza," a sort of high school or college intermediate between the common schools and the university, and together with these constituting a graded scheme of education. This was a great advance. Unfortunately it hardly became more than a scheme, for it had no more than been put in effect when there supervened the period

of revolutions that practically put a stop to all educational work until the end of the century. During that period some educational plans, orders, or laws were put forth and on paper a thousand schools, the Institutos, and the university were running; but nothing effective in education was really being done. The country was too much otherwise occupied. The university, at the end, had, indeed, a large attendance—five to eight hundred; but as it had continued to accept and graduate the ill-prepared students of the common schools, young men with almost no basis of an education, it had brought upon itself the reputation of being largely a "title-mill." It turned out hundreds of "doctors" of all kinds, and Cuba, even more than the United States, became the victim of degreed, diplomaed ignoramuses.

Altogether it may be said there never was in Cuba under Spain anything like popular education. The people were illiterate. There was, in the words of a Cuban, "a law but never a system of education," and there had been in teaching but one great name,—Luz Caballero; in educational law one,—Captain-General Concha.

The first American intervention brought to Cuba her first educational awakening. Education is with Americans a national hobby. Whenever, for whatever cause, a people has come under our national tutelage, our first thought and pains have been to put them to school. We had done so with negro and Indian, and we did so now with redoubled zeal and energy with Cubans. Great appropriations were made, new orders and laws put forth. It was to be a veritable revolution. In a few months the wretched, inefficient, merely nominal schools of Spain's régime were made real, equipped, and trebled in number. A complete system, taken from the school laws of the state of Ohio, was established, and under zealous, disinterested American officials, put in effective operation thruout Cuba. Its essential features were:

1. Payment of all costs from the national treasury.

2. Participation of the people in school matters thru local boards and superintendents elected by the people.

3. Like participation of the government thru the Secretary

of Public Instruction (a cabinet officer), a General Commissioner, a General Superintendent, and six Provincial Superintendents of education appointed by the general government.

4. Technical and administrative inspections. The superior school age limit was at once raised from nine to fourteen years, a mighty jump. Normal and summer schools were established. Some two thousand five hundred teachers had to be and were improvised. Textbooks were provided by translation from the English. The university and the provincial Institutos were reorganized, reestablished, enlarged, better equipped, and put upon a more modern and practical basis. The School of Arts and Trades, a mere workshop under Spain, was made an effective technical school where young men could really learn a mechanical trade. Special courses and schools, English for any who desired, drawing and modeling for artists, cutting and sewing for girls, and other special courses were made a part of the system.

Having revolted against the old Spanish order of things, the people of Cuba met all this with tremendous enthusiasm, too much in fact, as a child with a new toy.

That with so many innovations and radical changes the whole was able to be put in operation seems mainly due to the energy and determination of two men, General Leonard Wood and Lieutenant Matthew E. Hanna, U. S. Army, Governor-General and Commissioner of Education, respectively, of Cuba. The latter especially, going far beyond all mere official duty, by his untiring patience, tact, and zeal, won the good will and cooperation of Cubans. Traveling almost continually at great pains and inconvenience over the whole island, he visited the remotest places and districts, instructing and making enthusiastic public, teachers, and pupils alike. He left in his work a record that can hardly again be equaled. At the end of his administration of three years, his department was able to make perhaps the most interesting and creditable showing in all Cuba's exhibit at the Buffalo Exposition. No American, of all that then or afterward labored for Cuba, came nearer to the hearts of the Cuban people. To them he will hereafter stand with their own Luz Caballero.

His work and personality, more perhaps than anything else American in Cuba in this generation, brought Cuba nearer to America.

He left his system working.

Among Spanish-speaking peoples, education has always been scholastic in character, abstract, theoretical, and unpractical. It does not look to the life or business of the student, but addresses itself rather to culture as its final object, for effect, for the prestige of learning, but little to the development of character. It is regarded as an "accomplishment," not as a weapon in the struggles of life. It uses dogma rather than appeal to intelligence. It is individualist, not national or popular. Its tendency is, therefore, to care for the higher and to neglect the common branches; to fill the universities and to abandon the schools. Such, in fact, were it and its effects in Cuba. Being so little practical, it ruled and kept out almost everything in manual, mechanical, industrial, and agricultural training, when in fact these constituted Cuba's greatest need. Down to Spain's last day in Cuba there was but the beginning of one little school in the line of practise or application, the School of Arts and Trades before mentioned.

The main and highest effect of all the innovations and changes introduced by the first American intervention would have been to change this Spanish view and habit of education to the more modern, progressive, and practical American one, —that education should be popular, not individualist; a means, not an end; practical, not ideal; that it should prepare men for the work of their lives, not be aimed mainly at public effect. This, done, would have been great accomplishment. The seed of it the first intervention did, indeed, sow and see germinate and begin to grow; but that intervention lasted too short a time to protect and nourish the new system to permanent, sure, and lasting development.

When the Americans withdrew from Cuba, the new system, now without the support of those who had established and knew how to operate it, and coming in conflict with the old fixt ideas and habits of the country, yielded at point after point, to the extent in a few years of being almost over-

whelmed. This was perhaps to have been expected for a long list of reasons.

The changes had been very sudden and violent. The Cubans knew little of administration. The new system was very republican among a people by history, inheritance, tradition, and genius, monarchic. It had been besides impossible to completely adapt the Ohio law to Cuban conditions. The Cuban central government could be given little voice in the management of schools and still preserve republicanism in the law. The Cuban citizen gave up not one cent directly in taxes for the schools; yet thru the election of a local school board he in fact controlled in school matters. This was obligation without rights on the side of the government and rights without obligation on the side of the citizen, an illogical condition sure by itself to result in a worse. Further, we gave them an overdose. There is no people that has like faith or approximately like faith with us in school education as a cure for every human defect, individual, national, or racial. We prescribed it in too great quantity in succession to Indian, Negro, Filipino, and Cuban, with the same result in every case,—the patient's stomach turned.

The Ohio school system, then, piecemeal in half a dozen years in Cuba, from poor administration, lack of adaptation or opposition, lost its vigor and application. Hours of work and requirements of competency were relaxed, teachers and officers allowed to grow careless, school censuses and elections neglected, personal and family influence allowed to creep into appointments, compulsory attendance dropt, politics of the most virulent and partizan type and small graft finally seized upon and bore down the whole system.

It will be necessary for Cuba to go back a course, working over anew for herself her system, and better adapting it to the genius, form of government, and state of advancement of her people. Nothing else will accomplish education, not more money—the state now spends $4,000,000 annually in education—nor other officers, nor the granting, however much, of what different communities think they should have. General reform and adaptation are the need, and the greatest

lies in the law and working of the boards charged with the management of local school affairs. "The force of law," says Elihu Root, "is in the public opinion that prescribes it." It is to be doubted that in Cuba public opinion ever prescribed a board of education. As to their workings, "they have," says a Cuban writer on education, "contributed to the discredit of the schools created by the state. . . . Their appointment of teachers has not been founded upon the competency or professional history of the latter; it has been the work of caprice or arbitrariness . . . nepotism and favoritism with all their attendant immoralities." These boards being composed often of illiterate men and almost always of partizans in friendship, family, or politics, understanding little of the requirements of law, and so in a chronic state of disorganization and discord, their decisions command neither respect nor obedience. They seem to breed only protest and complaint.

The abuse of politics in school matters will probably not be lasting, but, as with other peoples, correct itself with experience. But the Spanish races' striking and characteristic lack of respect and unrestrained jeering at everything that does not derive its being and authority from some source esteemed higher than just common men, already doing much to hurt Cuba's republican school system, will probably long continue a troublesome and inimical factor in Cuban education.

Unlike us in the United States, in Cuba there is no color line. White, black, and yellow, European, African, and Asiatic, attend the schools, institutes, and university, and work, play, and sit together in still unbroken accord. There is some little hesitation when it comes to the color of the teacher; yet it is hardly serious. Most strongly put, the whites prefer white teachers; that is about all. The question rarely crops above the surface, as out of some four thousand teachers, three hundred only are emphatically negroes.

Nor, contrary to what might be supposed, does the question of religion ever come up in connection with the schools. However much disturbed by revolutions, politics, and other

things, Cuba has never been torn by religious differences. She has been spared that.

Quite remarkable is the large part taken by women in teaching. They constitute three-fourths of all the teachers of the island. Cuban mothers, however, apparently take no part or public interest in school matters. That has not yet become the custom. Among the pupils, also, girls far outnumber boys. Beyond fourteen, boys drop out almost entirely, and Cuba is thus educating her young women beyond her young men and perhaps laying the basis of future unequal pairing and of consequent marital unhappiness, at least upon the side of women.

. . . For play, exercise, and breathing spaces there are almost no provisions, and growing children suffer from lack of room for movement. To this add that the delicious, easy, soothing climate does not conduce to exercise, nor in Cuba does the body prompt thereto. One rarely feels the desire or physical demand for movement as in other climates; just the reverse, an easy, restful, sweet self-content pervades and lulls the body. The running sports and outdoor games, therefore, that elsewhere help to make the body strong, are largely wanting in the Cuban schools, and we see in consequence a large number of narrow-chested, consumptive-looking children. In the cities some effort has been made to remedy this lack of exercise with indoor calisthenics, but the effort only serves to emphasize its own pitifulness and the general lack of appreciation of the seriousness of the condition. For this there seems no hope for long. It is itself a question of education. Commendably, the university is beginning to lead in that direction. The strong address made last year at the commencement exercises by Dr. Gabriel Casuso of the School of Medicine merits the attention of all Cuba.

But the most significant thing in all Cuban education is the wide and ever wider-spreading study of English. Among Cuba's two million people, forty thousand, or one in every fifty, are studying English in some way in school or out. It shows the mental trend.

R. L. Bullard

Monterey, Cal.

VIII

THE PRECEPTORIAL SYSTEM AT PRINCETON [1]

This is the fifth year of the preceptorial system. We can look at it and assess it now in the light of experience. It has past the experimental stage, but the period of experiment thru which we have carried it has taught us many things with regard to its proper use and application which should enable us to employ it hereafter with greater confidence and intelligence.

It is not, primarily, a system of instruction. Its chief object is not efficient teaching. It is not an improved classroom method or a new way of drill to keep the pupil up to his tasks. It is a system of *study,* primarily intended for the reading courses, to give to them means of work as direct, as simple, as individual as those long employed in the laboratories of the sciences. It has been too commonly supposed by observers, even by admiring observers, of the system outside Princeton that it is its characteristic feature that teachers meet their pupils informally in very small groups for intimate instruction. That is not the fundamental matter. The essence of the system is that "classes" and classrooms are done away with, except for purposes of drill. A "course" does not consist in following a certain teacher's lectures or in "getting up" certain texts to be recited in class. It consists in a body of reading such as any mature man would naturally undertake, whether he had the advantage of experienced guides and teachers or not, if he wisht to make himself master of a certain subject. The men read subjects; they do not get up courses. Lectures are supplementary, explanatory, illustrative, are an excellent means of stimulation

[1] From the Annual Report of President Woodrow Wilson of Princeton University, for 1909.

and additional exposition, but could be dispensed with, often have been dispensed with, without materially affecting the processes of study or in any way robbing them of their reality and vitality. Grown men who have ceased to be schoolboys are systematically reading great subjects. That is the essential and central fact of the system. It is not a new method in pedagogics.

The " conferences " with their preceptors to which the men are periodically summoned are immensely important, but they are not recitations and the preceptors are not coaches. They are not teachers meeting their " classes " in small " divisions." They meet their men to discuss the reading they have done and to draw out its various significance, by comment, by amplification out of what they themselves have read, by mental exchanges of any kind that may prove natural and serviceable. Their object is, of course, to see that the men have actually done the reading that is to be discust; but it is also to see that they have understood it, to render them counsel, assistance, and stimulation; and many of them have told me with great pleasure how they have seen their men grow under the process, begin to think for themselves, and insensibly learn to use books naturally, for the sake of their contents, and not for the sake of making a creditable show of diligence and intelligence at the " conference." In brief, these conferences between preceptors and small groups of men assigned to their guidance (the groups range in number from two to six men) is a method of associating older students with younger upon as natural a footing as possible.

The system is a method of study, but also a method of close association between pupil and teacher. Intimate association, informal, unforced, natural, is the only certain means of intellectual contagion. A rare occasional man here and there may spread the contagion of mind and spirit which is the real power of the teacher by means of lectures and formal classroom exercises, if he be a man of exceptional genius and possess a personality which only his presence and speech are needed to interpret; but the rest of us must be known and sampled in some everyday fashion of constant intercourse to

be felt as comrades of the mind, to be recognized as persons whose influence can not easily be shaken off or forgotten. The method of the preceptorial system is not so much a method of instruction as a method of association and influence. This, and no formal matter of the number in a conference group, is the conception which is of its essence.

It is a process of study which is meant to be a means, not so much of instruction, as of intellectual development. If it fails of becoming that, it is a mere improvement in pedagogic method, worth while, no doubt, but no great matter. It has not failed of becoming a means of intellectual development among us. Our preceptors are, almost without exception, men of unusual parts and of unusual personality. They make themselves felt as men, as intellectual guides, as original thinkers and independent students of their subjects, and often also as friends and enjoyable companions. If they were not such men, vitality and reality would go out of the system at once and it would have no real significance except as a means of keeping men at their tasks, of keeping them at work between examinations. If I had not had what seems to me conclusive testimony to the effect that the preceptorial conferences have served these genuine and highest purposes of education, I would feel that I must report them useful, indeed, but a great disappointment.

It is evident, however, that this full and satisfactory use of the system is not possible in all studies or at all stages of study. At the outset we attempted to apply it somewhat indiscriminately all along the line, in studies of every kind that happened to lie outside the laboratories, wishing rather to ascertain its limits by actual experience than by premature theory. And we have ascertained them. That is exactly the service our five years of experience has rendered us. We now see pretty clearly where it is applicable and where it is not, where it can be applied in full and where it should be applied only in part, or only in a modified form. That is what entitles me to say that it has past its experimental stage.

There are various courses given, particularly in Freshman and Sophomore years, which are elementary and which con-

sist in a uniform drill in certain fundamental principles and processes: the courses in elementary mathematics, for example, thru which all the younger men are put, and the courses in Greek and Latin composition. Here conferences are meaningless and unsuitable. It is, of course, desirable that the men should meet for drill in small classes, in order that the drill may reach each man at each exercise; but it is not necessary that the classes should be as small as preceptorial groups. They may be two or three times as large without loss of efficiency and particularity in the teaching and may be conducted by the older and more familiar class methods. Most of our Freshmen come in very meagerly provided with vocabularies in Greek and Latin, and a great deal of the teaching of the first year must be devoted to familiarizing them with a large enough number of the words most used in the writers they are to read to enable them to use their texts with some freedom and pleasure. This teaching is also obviously of the nature of drill and can, my classical colleagues believe, be undertaken in some simpler way than we have hitherto used under our new system. All such courses fall necessarily under the head of instruction, not under the head of education,—of intellectual stimulation or development or of initiation into great subjects.

There is a training, too, in the fundamental general principles of a subject like economics which can be given in classes. It requires only clear and precise definition and exposition, deals in definitely stated propositions which constitute the general and undisputed ideas of the subject, need not be based upon excursive reading, and is suitable to be handled by lectures and fixt in the minds of the students by formal recitation. Here, again, large lecture classes and small "divisions" for recitation afford as suitable and efficient means of teaching as can be employed. It is instruction and must be systematically organized as such.

There is still another function of teaching which may be called explanation. It is best illustrated by an example taken from the Department of Mathematics. Certain members of the teaching staff of that Department keep definite hours in

easily accessible rooms, usually in the public buildings of the university, where it is understood that they may be consulted by any student who wishes to have his mathematical work more fully explained to him than it has been explained in class, difficult points cleared up, processes made plain to him which he has not fully comprehended, or the reason of which he has not seen at all; and the students avail themselves of the opportunities thus afforded them very freely, without formal appointment. The classes in the higher mathematics are for the most part small enough to make the relations of teacher and pupil very direct, personal, and informal, a veritable preceptorial relationship; and in the more elementary classes the accessibility of the instructors at certain fixt office hours suffices to accomplish all that preceptorial conferences could accomplish in so formal and exact a science.

It is outside the fields of drill, formal training, and occasional explanation that the preceptorial system has its proper application and its most noticeable and admirable results. In the reading subjects, and after the elements of a great subject have been mastered, it serves to bring out by its intimate and informal processes all the most natural and fruitful methods of study; serves as a means of teaching men how to read and think for themselves, how to approach great subjects, not like boys, but like men; throws lads as they grow more thoughtful into close association with men who are older and more mature and whose studies have touched them with an enthusiasm for the subjects they are teaching; makes for independence, maturity, and intellectual development. This is what we have desired and what we are accomplishing. This is the preceptorial work proper, to which other, earlier processes are fundamental and preparatory.

Much, of course, remains to be desired. The system has accomplished no revolution in human nature; and it has not overcome the very serious impediments which exist in the present competitive social structure of our universities or in the extraordinary development among our undergraduates of activities of every sort which absorb their attention and divert their energies from their university work. Teacher and pupil

do not live in the same atmosphere. Their lives are separated and contrasted alike in kind and in interest. The undergraduate lives in a world in which other things than study take precedence of it as if of course. He turns aside from the things which chiefly engross him to have a brief conference with his preceptor about reading which lies remote from the ordinary courses of his thought. And his preceptor can not be his companion in the matters which constitute his life. The one lives in one world, the other in another. They are not members of the same family or of the same social organism; and the rivalry between the life and the work of the student generally results in the victory of the life. If that life does not actually absorb the greater part of his time, it does absorb the greater part of his thought and of his ambitions. Under our present university organization the preceptorial system can be carried only to the borders of the life of the place, not to its center; and so long as this is the case its results, admirable as they have been, must disappoint us.

There are other things, too, which stand in the way. If you look into any one of the departments of study, you will find readjustments of the curriculum needed, better assignments of reading, a larger staff necessary to do the work readily and well and in its true spirit and freedom from artificial restraints. But these difficulties are chiefly administrative and can be gradually overcome as we study the matter. The system has approved itself and has had admirable results. We can by degrees give it better subject-matter, better means, and full ranks of teachers. As soon as possible we must give it also an atmosphere to breathe.

IX

CURRENT EDUCATIONAL PUBLICATIONS[1]

Arnold, Felix. Attention and interest; a study in psychology and education. New York, The Macmillan company, 1910. 272p. 12°.

An attempt to clarify and arrange the many facts that have been brought to light by numerous experiments in the psychological laboratories, not an effort to uphold any special theory or school.

Baldwin, W. A. The high school: its weaknesses and suggested modifications. Report made to the New England association of school superintendents. Boston, New England publishing company, 1910. 12p. 12°.

Reprinted from Journal of education, Boston. Summarizes criticism of high schools under two general heads: 1. The work is too much dominated by colleges. 2. The teaching is not pedagogical. Makes recommendations under four general heads: 1. Standardization. 2. Modification of curriculum. 3. Professional training of teachers. 4. Method.

Beale, Dorothea. Addresses to teachers. London, New York [etc.] Longmans, Green, and co., 1909. 79p. 12°.

Lectures dealing with the character, the spiritual outlook, and the mental training of the teacher, rather than with methods of teaching.

Bhabha, H. J. Special report on manual training in schools of general education. Bangalore, Government press, 1909. 145p. illus. 8°.

Based on notes of inspection taken during study leave in the United States and England in 1906-07 by the writer, who is inspector-general of education in Mysore, India. Interesting for his impressions of American methods in manual and industrial training.

Binns, Charles L. *and* **Marsden, Rufus E.** Principles of educational woodwork, a handbook for teachers and others interested in education. London, J. M. Dent & co.; New York, E. P. Dutton & co. [1909] 310p. 12°.

This book deals with the teaching and psychological aspects of educational woodwork, and while recognizing the importance of self-activity and the acquirement of skill, is based on the principle that the cultivation of the intelligence, of active and responsible brains, forms the chief claim of handwork to a place in schools.

Burritt, Eldon Grant. The pupil and how to teach him. Chicago, W. B. Rose, 1910. 254p. 12°.

A manual of principles and methods, endorsed by the Educational committee of the International Sunday-school association as a suitable text-book for the training of Sunday-school teachers.

[1] Compiled by John D. Wolcott, Acting Librarian of the United States Bureau of Education, to which books and pamphlets should be sent for inclusion in this record.

Bustico, Guido. L'educazione vocazionale e la scuola. Desenzano, F. Legati e c., 1909. 16p. 8°.

Carnegie foundation for the advancement of teaching. Fourth annual report of the president and of the treasurer, October, 1909. New York City, 576 Fifth Avenue [1910] 201p. 8°.

Parts 1-2 deal with the current business for 1908-09 and with the working of the rules for retirement, including a presentation and discussion of the new regulations regarding pensions after 25 years' service as professor. Part 3 reviews conditions in tax-supported institutions, such as state universities and agricultural colleges. Part 4, Educational administration, has sections on Financial reports, College advertising, Function of the college trustee, Principles of college administration, and the College registration office, while Part 5, Educational problems and progress, has sections on the Use and limitations of a standard unit in secondary education, Articulation of high school and college, A practical illustration of the use of college requirements for admission, The preparatory department, Weighting of college requirements, and Educational criticism and educational construction. Part 6, De mortuis, and the Report of the treasurer, with the appendix and index, conclude the volume.

Coutts, James. A history of the University of Glasgow from its foundation in 1451 to 1909. Glasgow, J. Maclehose and sons, 1909. 615p. illus. 4°.

Hecker, Eugene A. The teaching of Latin in secondary schools. Boston, Schoenhof book company [1909] 129p. 12°.

A discussion of methods and material for teaching preparatory Latin.

High school teachers' association of New York City. Choosing a career; a circular of information for boys. New York, Pub. by Students' aid committee [1909] 22p. 8°.

———— Choosing a career; a circular of information for girls. New York, Pub. by Students' aid committee [1909] 26p. 8°.

Hodson, F., *ed.* Broad lines in science teaching, with an introduction by M. E. Sadler. London, Christophers [1910] xxxvi, 267p. 8°.

Also published in New York by the Macmillan company. "An educational work of unusual importance . . . a collection of secondary school methods under the editorship of Dr. F. Hodson. Among the individual papers are The scope of nature study, by Edward Thomas; Biology in schools, by Oswald Latter; The teaching of hygiene, by Alice Ravenhill; Geography, by J. H. N. Stephenson; The present condition of physics teaching in the United States, by Dr. C. R. Mann." —Publishers' weekly, February 12, 1910, p. 938.

Hubbell, George Allen. Horace Mann, educator, patriot, and reformer; a study in leadership. Philadelphia, W. F. Fell company, 1910. 285p. illus. 12°.

In the intervals of the busy life of an educator, for more than six years, the author, formerly a professor in Antioch college, has been engaged on this biography, which is based on original documents furnished by Messrs. George C. and B. Pickman Mann, and on much new material gathered from those who knew Horace Mann in Massachusetts and in Ohio.

Knabe, Karl A. F. Das deutsche unterrichtswesen der gegenwart. Leipzig, B. G. Teubner, 1910. 108p. 12°.

Krause, Carl Albert. The teaching of modern languages in German secondary schools; report to the New York City Superintendent of schools in 1908. [Milwaukee, Wis., National German-American teachers' seminary, 1909] 12p. 8°.

Reprint from Monatshefte für deutsche sprache und pädagogik, v. 10, nos. 6, 8, June, November 1909.

Parlin, Charles C. The twentieth century high school. [Oshkosh, Wis., Castle-Pierce press, 1910] 16p. 12°.

President's address of the Northeast Wisconsin teachers' association, at Oshkosh, February 4, 1910.

Paulsen Friedrich. Aus meinem leben; jugenderinnerungen. Jena, E. Diederichs, 1909. 210p. illus. 12°.

Paulsen's autobiography up to his appointment as privatdozent, 1877.

Pouget, Auguste. La liberté d'enseignement d'après trois hommes d'état italiens (Minghetti, Bonghi, Mamiani) Chaillevette, l'Auteur [1909] 82p. 8°.

Rein, Wilhelm. Grundlagen der pädagogik und didaktik. Leipzig, Quelle & Meyer, 1909. 140p. 12°. (Wissenschaft und bildung, hrsg. von Paul Herre)

Ruediger, William C. The principles of education. Boston and New York, Houghton Mifflin company, 1910. 305p. 12°.

St. John, Edward Porter. Stories and story-telling in moral and religious education. Boston, Pilgrim press [1910] x, 100p. 12°.

CONTENTS:—Educational value of the story.—What a story really is.—Use of idealistic stories.—Realistic stories and how to use them.—Some vital characteristics of good stories.—Some tricks of the story-teller's trade.—Learning to tell a story.—Story-interests of childhood, of early adolescence, and of later adolescence.—How to use stories.—Sources of the story's power.—Where to find stories. Each chapter is followed by hints and outlines for study of its topic, and by suggestions for further reading.

Schiele, Friedrich Michael. Geschichte der erziehung; vier vorlesungen, gehalten im ersten Stuttgarter hochschulkursus für lehrer und lehrerinnen, 1909. Leipzig, Dürr'sche buchhandlung, 1909. 166p. 8°.

A brief outline and interpretation of developments in educational theory and practise from the earliest times to the present.

Tucker, William Jewett. Public mindedness; an aspect of citizenship considered in various addresses given while president of Dartmouth college. Concord, The Rumford press, 1910. 356p. 8°.

"The earlier addresses, not necessarily earlier in time but in arrangement, have to do with some of the present needs and requirements of citizenship. Incidentally yet directly principles of good citizenship are discussed. Later, addresses are introduced dealing with men or with events illustrating in one way or another some aspect of citizenship. And in the concluding addresses account is taken of various educational agencies which may be expected to bear their part in the training of citizens."—Pref.

Wood, Thomas Denison. Health and education. Chicago, University of Chicago press, 1910. 112p. 8°. (National society for the study of education. Ninth yearbook, part 1)

CONTENTS:—Health examinations.—School sanitation.—Hygiene of instruction.—Health instruction.—Physical education.—Bibliography. "It is proposed in this yearbook to consider briefly the different phases of educational administration, supervision, and instruction which have to do with health."—Pref.

X

DISCUSSIONS

THE CLASSIFICATION OF PUPILS

Something is wrong with our system of instruction in high schools. If there were not something wrong somewhere, it would be difficult to account for the general complaint of teachers that pupils lack seriousness, and that they derive far less benefit than they ought to derive from their high school course.

It is the fashion with some to lay the blame upon conditions in the community. Society in general is said to be frivolous, to be grossly material, to put little value upon intellectual pursuits. Others say that athletics, fraternities, and sororities, engrossing social interests of the pupils outside of school, are responsible for the attitude of pupils toward their studies. One group of educators will tell you that our pupils are dissipating their energies upon modern fads, such as domestic science, manual training, nature study, instead of concentrating their efforts upon the old-fashioned fundamental courses; another group of educators is equally positive that our present ills are due to our efforts to maintain a medieval course of study against the modern tendency toward the practical and the utilitarian. Doubtless, all of these explanations, tho some of them are clearly contradictory, have some foundation in fact. Doubtless, too, no remedy that can be applied will ever make pupils quite so earnest and studious as their teachers would like them to be. Boys and girls will never see things with the eyes of adults. For this let us be truly thankful, since the freshness and spontaneity of youth, "the genial sense of youth," render the children immune to many of the mistaken policies of their elders.

But, after all other explanations have been made, there is yet one of which little has been said. It is what I shall call "the fallacy of classification." We have in the schools pupils of all grades of ability and interest, and we classify them, not according to their ability and interest, but according to the number of years they have spent in school. Then we proceed to instruct them in such a way that a majority may accomplish enough to entitle them to pass into the next grade. By this method of instruction and classification a positive injury is done to both the most efficient and the most inefficient in the class. The inefficient are asked to do more than they are able to do and, inevitably and naturally, they fail or are promoted by grace into a grade where they are still more unfit for their tasks. The efficient pupils, on the other hand, being required to do much less than they are able to do, are injured in one of two ways: either they conceive the notion that life is easy and may be forced to yield them rich returns with little effort, or retaining their interest and ambition for a time, thru a disuse of their powers, they suffer paralysis and atrophy.

Here, then, we have the spectacle of a public school system, supported at great expense, failing to reach two important classes of prospective citizens,—the weak and the strong. It is clear that some plan ought to be devised whereby we may reach all who come to us to prepare for citizenship.

In any reclassification that may be made we must try to retain the obvious advantages of the group system. Even if it were practicable for each pupil to receive individual instruction out of all relationship with others, it is very doubtful whether such a plan would be wise. The stimulus that comes from class work is a great aid to both teacher and pupil. Then, too, the class system creates in a pupil democratic feeling, the sense of the solidarity of his group; it tends to break down the isolation and the selfishness, both of which are strong characteristics of the young. A great number of civic virtues may be developed by the daily contact which the group system requires. Such advantages must not be surrendered.

But the great objection to the present plan remains. We

do not adjust our work to the capacity of the individual, and we can not do so while we are forced to deal with pupils after the present fashion. The English universities have long recognized the difficulty by allowing students to classify themselves as either "pass" or "honor" students. We can not, of course, transplant an English university practise into the American high school. The age of our pupils and the different environment would prevent that. Too many of our boys and girls, I fear, would be in the "pass" group and too few in the "honor" group. But we can accomplish practically the same results by grouping pupils more nearly according to their ability instead of grouping them according to their years in school.

Most high schools have a four-year course. Most pupils enter at the age of approximately fourteen, and most of those who are graduated are approximately eighteen years old. At the end of each year all who have attained the minimum average required, pass into the next grade. That is what I call "classifying according to the number of years in school." In other words, it is "passing" and "graduating" which are the incentives to students under this plan. If a pupil can not "pass," he drops into the next grade or he drops out of school. If he can pass, he goes into the higher grade and there repeats the endeavor of the year before. To be sure, he may "pass" with a higher average than some one else; he may have learned more than some one else; but he may have learned far less than he ought to have learned with his ability and natural advantages. This last is the important point as regards superior pupils: they may have learned far less than they ought to have learned; they may have failed to give their powers the exercise their powers were inwardly craving. I say "inwardly craving," because it is not to be supposed that if a normal boy were to be asked whether he wanted to do more work, he would answer in the affirmative. There are often inward cravings for exercise which we do not ourselves recognize.

In a similar way there is an injustice to the weaker boys and girls. Altho they may be able to do well a small amount

of work, they may not be able to do well the amount required to "pass." Consequently they must fail. In my opinion such treatment is altogether unfair. It does not give the pupil a chance to do what he can. Life does not treat us in that fashion. If we can not do all that our friends and neighbors do, we may yet do something and find our little something acceptable.

The present plan of classification is wrong because it is undemocratic. Democracy, as I understand it, requires two things: it requires that able leaders shall be trained to a high state of efficiency, and it requires that every one, no matter how weak he may be, shall be given an opportunity to make the most of himself. Are we not failing to meet both of these requirements at present? Are we not keeping down the prospective leaders to the level of ability of the mediocre, and are we not depriving the prospective followers of their rights by allowing them to do nothing because they can not do all?

What, then, is the remedy? First of all, let us no longer emphasize "passing" and "graduating," because such emphasis gives pupils a wrong conception of their tasks and creates a condition whereby many who are really unworthy receive the conventional stamp of approval. To "pass" or to "graduate" may mean much or it may mean little. As teachers we must not encourage the presumption of pupils and of parents who profess great merit merely for "passing" and "graduating," altho those honors may have been attained only thru the indulgence of teachers. The standard which we should set is a standard of faithful work only.

To be more concrete, let us take a group of one hundred pupils who have just entered the high school. If the school is provided generously with teachers, these pupils will be divided into five classes. Most likely, however, under present conditions it will be possible to make only three classes. The pupils are to study, let us say, Latin, algebra, English, and botany. The course of study provides that during the year a given number of "lessons" and of pages shall be covered by all who are to "pass." Let us change the requirement and say that no one is to "pass," but that each one is to do the best

he can. The pupils may all start on even terms. After two weeks, differences in ability and in industry will be apparent to the teacher. Now is the time to change the classification. If the pupils maintain the same relative ability in all the studies, it will not be difficult to arrange a program that will provide a classification of the strong pupils in one class, and the mediocre pupils in another class, and the weak pupils in a third class. Of course, if a pupil is strong in Latin, mediocre in English, and weak in algebra and botany, it will be more difficult to arrange a program for him. Very likely it will be necessary to depart from an accurate classification in his case, but such as we can make will assuredly be better than what we provide for him at present.

After the new grouping the pupils will continue at their work as before, each group doing as much as the teacher finds possible. The ideal to be kept in view is faithful work. No one should have too much to do and no one too little. Of course this is not wholly possible. It would be possible only under a system of individual instruction, which we have found must yield to the group system, both for purposes of economy and for purposes of training in democracy. The groups must not be exclusive. Pupils must be permitted to rise into a higher group if they prove themselves able to do the work, and *vice versa* they must be dropt into a lower group if they become lazy or if they show inefficiency for the work of their group.

Under this plan much depends upon the size of the group. I should prefer a group of ten, if that were possible. If we can not have enough teachers to permit classes of such small numbers, then we must do the best we can and have larger classes. It is altogether possible to have an ideal in view, altho we may not expect wholly to attain it.

What will the situation be at the end of the first year? Some pupils will have mastered sixty lessons in Latin, for example; some, fifty; and some, twenty. None of them will pass. But in the course of time the next September will arrive and school will reopen. Classes will be formed to accommodate the pupils at the various stages of attainment, and work

will continue as before. Of course the program-makers will say at once that such a plan is impossible on account of the difficulties involved in making a schedule. The difficulties will be great, to be sure, and greater in a small school than in a large one. I have the authority, however, of a skilled mathematician and an expert in program-making for the statement that, if the school is large enough, almost anything can be accomplished with the program if the proper effort is made.

Some one will say now, "What about graduation and what about the admission of pupils into the universities?" They will be admitted when the required work is done. For some pupils three years will be sufficient to cover the ground, while for others six years will be necessary. Each one will go on up into advanced work when he is ready for it. Graduation I regard as one of the evils of the present system. It would be better to eliminate it, tho I do not think public opinion is yet ready for so radical a step. Therefore, for the present, I should suggest the granting of a diploma under the same circumstances as the granting of a certificate to enter the university,—namely, upon the completion of a given amount of work. Nominally, we follow that practise now in graduating our pupils, but actually we base graduation more upon the fact that a pupil has spent four years with us than we do upon faithful accomplishment of a given amount of work.

I do not propose this plan as a panacea. Not all the difficulties of teaching will be removed by any means. Nor do I think that the plan can be carried into effect without a careful elaboration of details adapted to the needs of each school that tries it. I do claim for the plan, however, that it will be a more scientific and a more democratic classification than we have now, because it will give a chance to the brightest and most energetic of our pupils to develop up to the measure of their capacity and, at the same time, will enable the others to do good work without discouragement and without the necessity of failure.

T. Warrington Gosling

Hughes High School
Cincinnati, Ohio

A PARTIAL REMEDY FOR SCHOOL CONGESTION

A brief survey of the public schools of New York and a few other large cities led an observer to describe the attitudes of the children under two headings: subordinate and insubordinate. Neither of these states of mind is desirable; no teacher, under examination in pedagogy, would give either as the attitude to be aimed for; and whether considered from the social or the purely individual point of view, the one tends to slavery and the other to anarchy. It is well then to examine what the public is accepting as its standard of an educated mind; to inquire whether the huge city systems give opportunity for a normal development; and if not, whether anything can be done about it.

New York City faces the necessity of organizing five hundred elementary schools, containing six hundred thousand children, into a coordinate whole, under a common curriculum. The problem is exceedingly complex. In spite of expert directors, New York's product looks very much like all products manufactured by wholesale. Is the human mind a commodity that lends itself to such manufacture? Where does personality have a chance? Undaunted originality and initiative are found in the rebellious group, whence they abandon school education as soon as possible. Weaklings also early drop out of the race discouraged. The only school which is able to retain these children voluntarily is the one whose principal is a man or woman able to inspire and support the teachers in efforts to make the schoolwork touch the children's lives in a vital way.

In almost every classroom there will be found children who conform to most of the requirements, and therefore do not rise to the teacher's consciousness as needing any special attention. Their undiscovered individualities are molded according to the common pattern for that grade. The teacher is grateful for their non-resistance, because all her energy is absorbed by her daily effort to carry her class along, and by her difficult children. Troublesome children stand a good chance of receiving individual attention in school, and their parents are likely to be notified of difficulties; but the child

who falls in line without protest is given the lesson which is adjusted to the average, no matter how unprepared he may be to digest it, because his teacher has not time to find him out. Is this the normal type we desire to foster? If he asks few questions and passes examinations, he goes from class to class unchallenged, and leaves school with his mind unknown. We like to think that school prepares boys and girls for life. Then we should ask ourselves how large a part are we actually, today, allowing our schools the power to take in this preparation?

A teacher of mathematics, who had four classes, about one hundred and fifty children, in this subject, was asked about the work of a certain girl. She was an exceptionally devoted teacher, but replied, "I do not remember which she is. I am sure to know only the very good or the very poor." Had this submerged girl opportunity for a normal development? Mrs. Emmons Blaine, writing upon truancy in *Charities and the commons,* made this significant statement: That school crowding and other deficiencies "may bear as heavily, or perhaps more so, upon the child who, whatever the paucity of his life in school, will sit at his desk."

The neglected element is the child's outside life and experiences, about which the school is ignorant. Is it not probable that many of these undifferentiated children, if they could be separated into individual units, would prove to be worth discovering, and worth the time and the additional teachers it would take to make their acquaintance, both in and out of school? Then would be learned what hindrances or helps they were meeting with, in short, what experiences they had upon which could be built the knowledge and training the school undertakes to give them. A college boy would not be taught conic sections until it was found whether he had knowledge of geometry; nor is it reasonable to teach little children that reading means getting the thought, when the printed page before them contains matter entirely outside their narrow comprehension. Yet every day children whose lives are barren of any experience which would make them understand, are given the same lessons as other children in the

class whose experience has been richer. Consequently the lesson is learned parrot-fashion merely. Think of the waste of energy by child and teacher, and the resulting stagnation of imagination, reason, and will.

It is reasonable to assert that information, or a personal acquaintance with a child's active life would so clarify even the best of teacher's view of him; that her instruction would necessarily become less dogmatic, more human, and more effective. It is equally obvious that, with forty children, the average teacher can not discern unaided the individual in each child. Most teachers, also, live at a distance from the school neighborhood; and the conscientious teacher is the one who finds it necessary to spend much time out of school hours upon preparation for daily teaching. This leaves little energy or time for closer acquaintance with the children. Any teacher, unless of unusual training and experience, or one with a self-sacrificing missionary spirit, will look upon forty children as enough alike to be taught alike, and to be reached by the same arguments, by the same discipline, by the same mental appeals; that is, to be taught by wholesale. Conspicuous variations are recognized and receive special treatment; but, unless the causes of such differences are known, the discipline adopted is not apt to fit, and fails to bring the desired compliance. On the other hand a knowledge of real causes inevitably suggests adaptations of method.

The members of a voluntary committee had keenly recognized, in their experiences with children in and out of school, the need for cooperation and mutual understanding between the teachers and the homes of their children. They found that information of any sort which explained or threw new light upon the children was welcomed by the teachers. One attendance officer exprest his appreciation of a home visitor's efforts. He said, "We are looked upon as police by many families. You go as a friendly visitor, and you can find out more and have more influence. Besides," he added, "you have a chance to get at the children when they are just beginning to stay away, before they get the habit."

Several skilled, experienced "home visitors," or "visiting

teachers," are doing this work on salaries, in New York and Boston; other cities are preparing to attack this problem of educating the whole child by the same means. In New York the following schedule is filled out for each case visited:

Name Address	Investigation
School Grade Age	a. At home
Complaint	b. At school
	Outcome Dates

MARY S. MAROT

NEW YORK

RECENT CHANGES OF VIEW AS REGARDS SOME POINTS IN THE HISTORY OF ELEMENTARY MATHEMATICS

The recent additions to our knowledge of the history of mathematics are among the most prominent evidences of the rapid progress made by this science during the last few decades. Mathematical history shares with applied mathematics the great advantage of bringing the mathematician into close contact with other scholars, since it traces the spread of ideas and concepts which have profoundly influenced the developments leading to present conditions. This contact tends to strengthen the bonds of sympathy and mutual helpfulness which must be preserved between the various fields of human progress in order to secure harmonious and effective developments of useful knowledge. To a large extent the history of mathematics concerns itself with subjects about which it is not possible at present to draw necessary conclusions, and hence it is liable to changes of view. We proceed to call attention to a few of these changes which relate to subjects with which all educated people are familiar, and which may be of especial interest to teachers.

Zero has been called the Columbus-egg of mathematics, and its great usefulness and late appearance among the number symbols have made its history especially interesting. The fact that the Greeks made such brilliant and extensive discoveries in mathematics and developed a geometry which remained a standard work for two thousand years, without discovering the importance and usefulness of zero has been a subject of wonder, even if it is admitted that they laid stress

upon the theoretic, rather than the practical, side of mathematics. Altho the history of zero has not appeared satisfactory, yet it was generally agreed that its discovery was due to the Hindus. Ten years ago there was probably no mathematical history in existence which presented a different view. Today we find that the best and most modern general history of mathematics; viz., *Vorlesungen über Geschichte der Mathematik,* von Moritz Cantor, ascribes the discovery of zero to the Babylonians and not to the Hindus, as had been done in the earlier editions of this standard work.

As the zero is essential for a complete positional arithmetic, the honor of having first possest such an arithmetic seems to belong to the Babylonians instead of to the Hindus, as was generally believed a decade ago. It should not be inferred that our present number symbols, about whose history there remains so much uncertainty, had their origin in the same country as the zero. It seems well established that these symbols originated in India, and that a symbol for zero was added long after the other symbols had been in use. The symbol which the Babylonians used for zero consisted of two carets placed horizontally ($\lesssim$) and hence differed very widely from the symbol now in common use. Cantor exprest the belief that the Babylonians were in possession of zero as early as 1500 B.C., but no definite evidence of its existence earlier than two or three centuries before Christ has yet been discovered.

Another point about which there has been a recent change of view relates to our system of measuring time and angles. It is well known that the custom of dividing a minute into sixty equal parts, called seconds, and the hour or degree into sixty parts, called minutes, can easily be traced to Babylon, where there was a well developed sexagesimal system of numeration. It is natural to inquire, what led to the choice of such a large number as sixty for a base of numeration? As is well known, our own decimal system is generally explained by the fact that early races counted on their fingers, and thus were naturally led to adopt ten as a base of numeration. The systems with bases 5 and 20, which are found

very much less commonly than our own, can also be easily explained from the standpoint of human anatomy. On the contrary, the sexagesimal system does not admit of such an easy explanation.

Five years ago nearly all the histories, if not all of them, which attempted an explanation, offered the following: It is known that the Chinese divided the circle into 365¼ degrees and that they considered the year as containing 365¼ days. Here there appears to be very clear evidence of a tendency to associate the number of days of the year with the number of the degrees in a circle. It was believed that the early Babylonians regarded the year as containing only 360 days, and hence they divided the circle into 360 degrees. They also knew that the radius of a circle could be applied to the circumference as a chord six times, and that each of these divisions of the circumference thus formed contained sixty degrees. Hence sixty appeared to be a natural base for numeration.

This explanation has been abandoned by Cantor in the latest edition of his *Vorlesungen* because it was observed that a system of numeration and notation must have existed before the people counted such a large number as 360, and that the Babylonians learned very early that the year contains more than 360 days, since observatories were established in their country at an early date. Cantor now adopts the following explanation: One of the two races, which united in the country of Babylon at an early date and were considerably advanced in civilization before they mingled, must have possest a decimal system, and the other a system to the base six. They were naturally led to adopt a system whose base was a multiple of each of the bases to which they had been accustomed. It must, however, be admitted that this theory has not been fully established even if it appears more probable than the one which it has replaced in Cantor's work and will probably replace elsewhere.

A partial change of view has recently taken place as regards the famous *Handbook of Ahmes,* which is still the oldest fairly complete work that has been deciphered. Some time

ago it was generally assumed that this handbook was intended for the élite Egyptian mathematicians at about the time when Abraham visited that country. The fact that it contained no problem involving the extraction of roots seemed to imply that this operation was then unknown in Egypt, and hence it was easy to explain why the area of an isosceles triangle was found only approximately by taking the product of half the base into a side, instead of accurately taking the product of half the base into the altitude. Recent investigations prove conclusively that the Egyptians knew how to extract the square root and had a word for this operation at about the time of Ahmes. Hence, some have been led to regard the handbook of Ahmes as the work of a student who was not particularly skilful, instead of regarding it as representing the highest type of mathematical work in Egypt at that early date.

The recent discoveries in reference to root extraction prove that this operation is much older than was formerly supposed. It has also been found that the Egyptians solved simultaneous quadratic equations at an early date, altho the *Handbook of Ahmes* contains only equations of the first degree. The instances of root extractions and solution of quadratic equations which have been met among the early Egyptians relate only to these operations when the results are rational numbers, and do not affect the claim of the Pythagoreans that they discovered the irrational quantity. In fact, the beauty and refinement of much of the Greek mathematics is far above the highest attainments of the older races as exhibited even by the most recent discoveries.

The instances of recent changes of view which have been noted above indicate what rapid strides the history of mathematics has made in recent years, even in matters which affect the teacher of the most elementary mathematical subject. These changes are the more worth emphasizing since it will be some time before they will be found in the books generally accessible to those who read only the English language.

G. A. Miller

University of Illinois

XI

REVIEWS

The Carnegie Foundation for the Advancement of Teaching: Fourth Annual Report of the President and of the Treasurer. New York: Printed by the Carnegie Foundation, 1909. 201 p.

The Fourth Annual Report of the President of the Carnegie Foundation for the Advancement of Teaching is, like its predecessors, not only a record of the current business of the year which it covers in the conduct of the retiring allowance system, but is a document of the greatest value to the cause of education in America with respect both to present conditions and to prospective developments. As has before been emphasized in these pages, these reports, and this last one in some respects even more than the three that have preceded it, mark an entirely new era in American educational criticism. The abundant resources of the Foundation wisely applied have rendered possible not only a more systematic collection of the statistics of education, but a closer and more detailed observation of the organization and policy of educational institutions than ever before in the United States. All this has been done, furthermore, to a greater extent than ever before at first hand and at close personal range. As a consequence, a sureness of judgment has resulted that is wholly unique in its breadth and objectivity, and has made possible the fearlessness of statement that is characteristic of these reports and constitutes in not a few instances their abiding value.

Part one of the report is concerned with the business details of the year under review. During the year the Foundation granted 115 pensions amounting to $177,000. It is now paying a total of 318 pensions at a cost of $466,000. The professors receiving these pensions come from 139 colleges, distributed over 43 states of the Union and Canada. To the accepted list seven colleges were added during the year: Coe

College, Iowa; Swarthmore College, Pennsylvania; the state universities of Wisconsin, Michigan, Minnesota, and Missouri; and the University of Toronto. Two institutions retired from the accepted list: Randolph-Macon Woman's College, which withdrew after deciding that the election of its trustees must be approved by a Methodist Conference, and the George Washington University, whose connection with the Foundation was ended by the action of the Foundation. There are now 67 institutions on the accepted list. This part contains also an interesting account of the exchange of secondary school teachers between Prussia and the United States, now in the second year of its operation, by which it appears that both the success and value of the experiment are undoubted and that it is wholly desirable to perpetuate this new phase of educational reciprocity. It is pointed out, however, that American secondary schools have not yet begun to appreciate the benefits to be had from this exchange in stirring the life of the school by bringing into it the revivifying outside element that the procedure provides.

The second part of the report contains an examination of the working of the rules for retirement as shown by the experience of the past four years. Two changes have been made in the rules by the trustees: one extending the benefits of the retiring allowance system so that service as an instructor shall count toward the earning of such an allowance; the other making retirement after twenty-five years of service possible only in the case of disability unfitting the teacher for active service. Except in the case of disability, the teacher under the rules as now framed can claim a retiring allowance only upon attaining the age of sixty-five. This change in the rules does not, however, deprive the widow of a teacher who has had twenty-five years of service of her pension. The withdrawal of the service pension, the reasons for which procedure are stated at length, has caused a great deal of unfavorable and, in part, unfair comment. These sections on the actuarial side of the retiring allowance system, on the reasons for the adoption of the present rules by the Foundation, and the reasons why college teachers retire, abundantly justify an

action that undoubtedly was unfortunate, in that it rescinded an important provision that had been widely accepted as being as stable and fundamental as any other part of the system. In the light of the experience gained by the four years of the working of the rules it was, however, necessary that this particular action should be taken, since there were not funds at hand sufficient to maintain the system along the lines of the original formulation. The really unfortunate aspect of the whole matter is the fact that the service pension on the basis of no experience should have been adopted at all at the beginning of the activity of the Foundation. The practical advice given to the trustees by the actuaries at this time is undoubtedly still sound and wholly pertinent to the present matter. "The problem is," they said, "only partly actuarial. No man can possibly predict what will happen under any assumed method of retirement. Frame your rules according to your judgment of what will best serve the interests of the teachers, within the general estimates indicated. Reserve carefully the power to amend your rules of retirement as circumstances may require, and go forward to acquire such experience as will enable you to make permanent and final rules."

The third part of the report is devoted to tax-supported institutions. The reasons which have governed the trustees of the Foundation in dealing with state institutions are stated in detail. Agricultural education and the agricultural college are also treated at length.

The fourth part of the report is concerned with educational administration, and considers financial reports, college advertising, the function of the college trustee, principles of college administration, and the college registration office. College advertising, which, in the words of the report, has assumed in recent years proportions, and it might have added, directions, which no one could have anticipated, is accorded its legitimate use, but receives almost for the first time the scoring that its misuse in far too many instances deserves. The other matters are equally of practical significance in the operation of colleges and universities, and should be read and marked not only by those branches of the service which they immediately con-

cern, but, and particularly in the case of treasurers' reports, by the public which should be no less immediately concerned in them.

The fifth part of the report is occupied with educational problems and progress and contains in detail a consideration of the use and limitations of a standard unit in secondary education, the articulation of high school and college, the use of college requirements for admission, the preparatory department, the weighting of college entrance requirements in favor of the classics, the relative value of educational criticism and educational construction. In the résumé of the report, which accompanies it, it is pointed out that the whole effort in this part of the report, as in former reports, is to urge upon the colleges of the country, whether state controlled or privately endowed, the necessity of articulation with the state system of education. In the last section on educational criticism and construction the President reviews the intention and scope of the Foundation as they have developed, and discusses the basis of the effective use of its opportunity in its future activities. He takes up the statement which has been made in several quarters that the Foundation might become an arbitrary force in education, and shows that its real power is dependent upon its fair discussion of educational issues. He concludes that the amount of money in the hands of the Foundation is insignificant compared with the college endowments themselves. "The chief asset that the Foundation may hope to accumulate is public confidence, won by accurate, temperate, and impartial study and discussion."

In the clearness of its apprehension of the field of effort of the Carnegie Foundation and in the definiteness of its statements this is, in many ways, the best of the reports that have been issued. It is impossible to lay it aside without a sense of commendation of the wisdom and seriousness of purpose that from the beginning have characterized the conduct of the affairs of the Foundation, and a renewed feeling of confidence in the importance and reality of the part which it is destined to play on the broad stage of American education.

COLUMBIA UNIVERSITY WM. H. CARPENTER

The Report of the Illinois Educational Commission—Springfield, Ill.: The Illinois State Journal Co., State Printers, 1909. vi+272.

The American system of public education, resting as it does on the legislation of individual states, enlists a large number of agencies in contributing to its progress, but the efforts of these are apt to be temporary and uncoordinated. The development of expert opinion by state associations, conventions, and similar groups is uncertain and wasteful. Those cities and states which have in recent years created commissions for the thorogoing investigation of the technical questions of education, and have provided the means for a clear and detailed formulation of their findings, have rendered a distinct public service. There is hardly a state or large city in America today that could not with profit to itself and to the country create a competent commission for the study of local problems and for the purpose of giving authoritative publicity to well digested conclusions.

The Illinois Educational Commission grew out of a widespread recognition of the chaotic character of school legislation in that state. The circumstances attending its composition and work seem to have been fortunate; it came in response to demands from laymen as well as educators, its members were peculiarly representative of various educational interests, and it had as secretary a man well known for his wide sociological interests. In addition to codifying the existing mass of contradictory and confused legislation the commission undertook to investigate certain large problems of administration in their state. The results of its investigations it issued from time to time in bulletins; and these have now been brought together in a substantial volume of nearly three hundred pages. Here is found a mine of educational information which no serious student of the administration of public education can afford to neglect.

The Commission frankly recognized that it could not cover all fields of educational endeavor, especially those with which other states had had little experience. It hardly touches such important questions as vocational education, moral instruction, physical education, and medical inspection, textbook

systems, and many others. But in its reports it has given much material bearing on such administrative problems as the organization and functions of state and county boards of education; the selection and functions of state and county superintendents of public education; the units of school organization; the certification of teachers; county teachers' institutes; and teachers' salaries.

Along the lines of the above topics the practises of the various states are set forth and described in helpful fashion. In some instances constructive legislation is proposed. In all cases there is a considerable body of constructive suggestion and argument which should do much to aid in the formulation of future legislation for Illinois and for other states. No one, of course, who studies American democracy as it works in our state governments, can hope that all or perhaps any considerable part of this suggestion and proposed legislation can become operative at once. But from this time on no one, layman or educator, can presume to express an authoritative opinion or to propose legislation in Illinois if he have not considered the work of this Commission. Its positions he must accept, or at least justify their rejection. In this respect, far more than in any legislation which may immediately result, is the work of the Commission to find its justification. In these high-grade means of creating public opinion will be found, finally, the chief resources of progressive movements in political democracies.

Scattered thruout the report are a variety of excellent adumbrations of principles of educational administration, some borrowed from other writers, some emanating from the Commission itself. It is to be regretted, however, that the Commission did not feel ready to formulate these principles more fully and more authoritatively. It must not be pretended, of course, that we have reached final conclusions in this field, but it ought to be true that the experience of our states, coupled with some interpretations and applications of political theory should be able to give us far more than we now have in the way of principles of administration of public education.

For, after all, the fundamental issues are not many. The most important of all is that involving the relative positions of laymen and experts in administration. Originally all administration was in the hands of laymen; but in proportion as education has developed, the administration of its technical phases becomes impossible to the layman—he must call on experts. But these, left to themselves, tend to lessen the peculiarly democratic and responsive character of American education. So the layman, responding to a deep-seated tradition, relinquishes control slowly. The expert, ambitious for the result which he can see so clearly, becomes unsympathetic with, and hostile to, the layman. The state of mutual suspicion engendered is not conducive to educational progress. And yet it is probable that both parties to the controversy are right. Each party must have authority and power in its own field. Can we not differentiate the territories in which each can be most effective and most contributory to progress on the one hand, and to the conservation of our democratic ideals on the other?

As a matter of fact, just this differentiation has been effected in the administrative schemes of our (educationally) most progressive cities; it has been accomplished in the direction and control of our best universities, hospitals, and other types of institutions. It has been measurably accomplished in the state administrative machinery of New York, Massachusetts, and a few other states.

The Commission has pointed out the great confusion which now exists regarding the character and function of state boards of education. But surely, according to our best political principles, the State Board of Education should primarily represent the lay interests in public education; and it should work thru experts selected by itself and finally responsible to itself. Why should we think of the state board as differing essentially from the boards of education of such cities as Boston, Chicago, and Indianapolis; and why should we not think of these boards, themselves responsible to the people, and influential with the legislatures, as accomplishing their aims thru carefully selected experts holding office for

long or indefinite terms, and giving their entire attention to administrative detail? Judged by this principle, the state administrative schemes of Massachusetts and New York are essentially sound (that which is alleged by some to be an undue degree of centralization in New York State is not the necessary consequence of the above arrangement); and the practise of many Western states having appointive boards composed mostly of educators and with popularly elected superintendents is essentially unsound.

The Commission in its valuable report does not ignore the above and many kindred considerations; but it seems to us that it has hesitated in its formulations, and has dallied too much with temporary expedients. We may expect legislation to come in piecemeal fashion and reluctantly; but that is no reason why the Commission, even while formulating and advancing tentative measures, should not have opened the way to a discussion of the larger principles of educational administration. In the present juncture it would seem to be especially important that such topics as the composition and functions of various state and local boards, the methods of selection, and the functions of the various experts from state superintendent down to school principals and teachers, the division of the state into administrative units and the differentiation of administrative function and authority among them, the financing of education, the agencies in the building of a teaching profession, and several others, should have evolved within and about them a series of governing principles which would indicate the most promising reconciliations or resultants of administrative efficiency on the one hand, and democratic control on the other.

But, tho the results of the commission's work seem to leave something to be desired, the example set by Illinois is one to be commended to other states. The advance of public education is worth some money and some effort; let us have more commissions, and let them be adequately enough provided with means in the shape of expert agents to enable them to accomplish good work, and to distribute and perpetuate the results of their deliberations. Progress in education by the

method of trial and error is better than no progress; but it is wasteful and slow, and unbecoming a civilization that pretends to belong to the twentieth century.

DAVID SNEDDEN

TEACHERS COLLEGE
COLUMBIA UNIVERSITY

High school administration—By HORACE A. HOLLISTER, A.M., high school visitor for the University of Illinois. Boston: D. C. Heath & Co., 1909. xii+379 p. $1.50.

The large number of recent books dealing with the American high school is another evidence of the increasing hold that this form of secondary education has in the public esteem. Public interest has shown itself in a generous support, which has operated to multiply very greatly the number of schools. Concomitant with increased expenditures and larger numbers has come a demand for greater efficiency. To this end supervision in some form has been deemed necessary. Save in the older states north of the Potomac, this supervision tends to connect itself with the state universities. A certain officer of the university is provided, whose main function it is to raise the standard of high school efficiency, chiefly in connection with the "accrediting" system. The inspector thus comes to have a very intimate and minute acquaintanceship with the problems and needs of the high school.

The book before us has come from such an experience. Before Professor Hollister became high school visitor, he was for some time city superintendent. We are, then, prepared to find that the book deals in the main with the concrete problems of the high school director. The work is specifically designed for the use of those advanced students in colleges who purpose to enter upon the work of high school administration, and for the guidance of those who have entered upon such work without a special preparation. The need of study and guidance on the part of both these classes is unquestioned.

But just how much assistance either of these can get from Professor Hollister's book is not evident. It is open to

question at the outset whether, in the limits of this book, it is possible to treat helpfully, not to say adequately, such a large number of topics. By actual count, within the compass of 310 pages there are discust one hundred and sixty-two separately named subjects. It is true that many of these are in reality sub-topics; but after all allowance is made, inadequacy of treatment remains as a striking characteristic. One who seriously needs help on any subject can hardly get it from a discussion of only two pages, the average here found. One is much inclined to think that some of the less important topics might well have been omitted to make way for fuller discussions of the more important.

What Professor Hollister does say in the limits allowed is, on the whole, sensible and good. Naturally, others will have different opinions on many points. The suggested work in English and modern languages pretty surely will not meet universal acceptance. In this connection it may be well to say that, thruout the whole book, the aim has been to present what has been proved rather than the novel. The English objected to above is hardly up to the approved. On the whole, the amateur who takes Professor Hollister's advice will seldom go far wrong.

Certain features are worthy of distinct commendation. The historic development of the high school is well presented. The references for further study are excellently chosen, and are given with helpful exactness. The problems at the close of each chapter, calling for further investigation, are aptly selected and well presented. The appendixes contain very valuable material: the weekly time tables of the German and French secondary schools, the programs of study in several of the better American schools, daily programs in some American high schools, and the state laws governing high schools. The book is well written and, on the whole, well printed. It has a good index.

W. H. KILPATRICK

TEACHERS COLLEGE
COLUMBIA UNIVERSITY

Psychology and the teacher—By HUGO MÜNSTERBERG. New York: D. Appleton & Company, 1909. xi+330 p. $1.50 net.

Professor Münsterberg wrote his *On the witness stand,* and *Psychotherapy* to show how laboratory psychology might be applied to the problems of law and of medicine. *Psychology and the teacher* was written to do the same service for education. The book, however, is not simply a work on applied psychology. The problems of the teacher are considered in their broadest aspect. "The whole world of educational tasks" is its province. It is presented as a book of idealism and reform. This reform is to be brought about, not by introducing the psychological laboratory into the schoolroom, but by inspiring teacher and pupil with high ideals, and furnishing them the scientific means for realizing these ideals. The service of psychology is in furnishing the means. The ideals themselves can be found only as the result of a philosophical investigation. The purpose of education is preparation for life, but the educational problem can not even be approached until the ideals of life have been discovered. Professor Münsterberg brings forward two ideals for consideration. These are "the pursuit of pleasure," and "the realization of eternal values." Pleasure is interpreted as personal gratification, and Professor Münsterberg makes an eloquent protest against an ideal so unworthy. True values are not simply for the individual nor for the moment; they are for all and they are eternal. Truth and knowledge, harmony and unity, happiness and beauty, progress and development, law and morality, and the religious values are valid for all because without them experience would be a chaos. These are the values which teacher and pupil should seek to realize. So much for the philosophical investigation.

The presentation of the data of psychology occupies the middle portion of the book. The more important facts and laws of normal individual psychology are stated succinctly and with frequent illustration from the laboratory. Their most important educational bearing is found in the fact that all consciousness has a motor aspect. Every stimulus is transformed into an action. The middle part of this transforma-

tion is accompanied by perceptions, feelings, memories, and the like. The action which a given stimulus will bring about is determined by the channel of motor activity which it finds open. The sort of mental state which will be brought about by the stimulus is also conditioned in this same way. "We think because we are acting," and what we think and feel is dependent on what we do. The implications of this doctrine are interestingly developed in the treatment of each of the more important mental functions, but its most interesting application is found in connection with the emotional side of consciousness. The feelings of the child are unsteady and easily modified. They are at first narrow and egotistic. As his activities increase in definiteness and complexity his feelings become also more definite and varied. This fact suggests the greatest opportunity and the greatest responsibility of the teacher. Here he finds the means for inspiring the pupil with an enthusiasm for high ideals. He constantly influences the pupil's emotional life, both by his formal teaching and by his attitude toward everything that arises. The importance of suggestion is very great in this connection.

The last part of the book is devoted to the work of the school. The author treats briefly a number of topics, and his suggestions are always excellent. Laboratory psychology throws light on many of these topics. Professor Münsterberg has no panacea to offer for educational ills. His suggestions are characterized rather by sanity and good sense than by any great novelty. His book is a very good book for teachers to read.

ADAM LEROY JONES

COLUMBIA UNIVERSITY

Methods of teaching—By W. W. CHARTERS of the University of Missouri. Chicago: Row, Peterson & Company, 1909. 255 p. $1.10.

This is an interesting contribution to educational literature. It must, however, be regarded as observations and devices for teaching from the author's personal point of view rather than as a fundamental treatment of methods.

It is hard to think of a treatise on method as being clear and thoro that does not begin with a statement of the conditions of the child to be taught, the subjects he must necessarily study, and the order of developing these subjects with due regard to their educational values viewed from the cultural and useful aspects.

Whom am I to teach, what am I to teach, and how am I to teach, are three very plain but very important questions, and those who would so answer them that we may be guided by their answers will do well to use language that is very definite in meaning. Mr. Charters is not fortunate in this respect. He speaks of the school as "An organized enterprise of society. Therefore, society possesses the right to require that the school shall educate its offspring so that they will be prepared to carry on the work of society with efficiency."

Just what this expression means in definite terms is hard to determine. What is meant by society? and what are the requirements of society in terms of education? Would it not be easier to say that the child is to live with other people and in order to do so to any advantage he must know some amount of language and the forms of its expression, as reading, penmanship, spelling, something of arithmetic, geography, and so on? In other words, is it not better to approach society thru the individual and individual needs rather than approach the individual thru society? It may be the same goal is in mind, but method is a question of *ways,* their simplicity and directness.

Again,—"The intrinsic function of history is to realize the past in such a way as to help us appreciate and get control of present values, or, to put it in other terms, history is studied to get a picture of the past in order to understand the present."

It is difficult from such an expression to know just what would be a plan of work in history. What is the past? What would be an adequate picture of the past, and what is an understanding of the present? Would it not be safer to say that we need to understand certain institutions, such as the government under which we live, the Church, and so forth, and in order to appreciate them we must know something of

the experiences thru which they have past to reach their present state?

"A motive is generically something which moves one." "The source of the power that will drive the pupil on to growth and higher development, to satisfaction and control is within himself," etc.

What Mr. Charters says will cause the reader to think, but it will not give him a positive guide for definite work. The school board, the school superintendent, the school teacher, and the parent are confronted with very definite problems. When they have read Mr. Charters they will have had occasion to think, and will have been helped thus far, but they will wonder what to do next.

JAMES M. GREEN

STATE NORMAL SCHOOL
TRENTON, N. J.

Habit formation and the science of teaching—By STUART H. ROWE, Ph.D. New York: Longmans, Green & Co., 1909. 248 p.

This book is written for teachers. "A formulation of method is needed in which this basic position of habit is duly recognized. The fact that there is a fundamental tissue of habit permeating ideational processes has been practically ignored in methods of instruction, while in methods of guidance or training, the problem of habit formation has been overshadowed by specific problems of mere management and control." Hence, the author attempts to work out the psychology of habit more fully than any textbook has done, and then offers suggestions for the application to school problems.

The particular problem of the teacher is to aid the child in the organization of experience, "so to manipulate the child's environment as to stimulate him to automatic learning, and, at the same time, lead him to the acquisition of truth and dexterity otherwise impossible." This organization on the part of the child results in the acquisition of two distinct types of reactions, habits, and ideas with the idea-habit as the connecting link. These two types of activity are essentially different, and hence the methods of procedure in developing them must be different.

Habits growing out of instincts are well developed according as four principles are borne in mind and carried out. First, there must be careful selection and demonstration of reactions to be made habitual; second, the idea of the habit to be formed must be developed in the mind of the learner, preferably thru the arousal of his own initiative; third, abundant and genuine practise must be secured; fourth, all exceptions must be prevented. Each of these four essentials in habit formation is then treated in detail.

The teacher has a duty in connection with each lesson taught, to decide just what automatic reactions he wishes the child to get; what special instinctive interests or reactions form the foundation for the habit, and the difficult points in the procedure. In other words, instead of allowing habit formation to be more or less a matter of chance, the author urges that it be as definitely and as carefully planned for as the giving of ideas. The child's initiative should be aroused by an appeal to instinctive interests. As President Eliot says, "By preference, permanent motives should be relied on from beginning to end of education, and this for the reason that the formation of habits is a great part of education, and in this formation of habits is inextricably involved the play of those recurrent emotions, sentiments, and passions which lead to habitual volitions. . . . Naturally, they will grow stronger and stronger as the whole nature of the child expands and his habits become more and more firmly fixt; and for this reason these same enduring motives should be continuously relied upon." The practise necessary in fixing the habit must be thoughtful, earnest, and attentive. Thru the presence of a strong personal interest, the child will create his own opportunities for practise as well as seizing upon those offered. Exceptions occurring in the reaction which is becoming habitual are due to weak initiative, variations in the situation calling for it, or to the reaction itself; therefore reduce these dangers to a minimum.

Bad habits are broken by forming good ones—positive education must be emphasized. The habits hardest to break are the unconscious ones. The same rules apply as in habit

formation of the other type, but with a difference of emphasis, especially in connection with the prevention of exceptions thru appeals to inhibition. The problems of drill are complicated both by pressure of broad, fundamental habits and the smallest and most specific automatism. Courses of study should indicate where important habits are to be formed. "The teacher must select habits fundamental or common to the widest range of important habits, avoiding the obstructive; he must secure valuable methods of procedure and emphasize the attitude of mind as generally important in life; he must increase the suggestiveness of the habits taught by substituting for chance suggestions specific applications in as many directions as possible. Breadth of knowledge on the part of the teacher, and a wide scope for review, are therefore implied."

The book is open to criticism in that the material is spread over too many pages, involving much repetition. However, as the author suggests in his preface, for those whose time is limited the very full summaries given at the end of each chapter offer a good short-cut. From a psychological point of view, it offers nothing new, being an application of James's psychology of habits. Its chief value lies in the fact that it forces to the front the importance of habit-formation in education and the vital need of planning for it, and thru the use of the subject-matter of the elementary schools as illustrative material, the book makes the problem concrete and real and suggestive to teachers.

NAOMI NORSWORTHY

TEACHERS COLLEGE
COLUMBIA UNIVERSITY

Professor Brander Matthews has returned in his latest book to the subject on which he is the first and undisputed authority, and has placed the world of letters and intelligence under obligations to him by reason of his philosophic, scholarly, and admirably proportioned treatment of the drama. His *Study of the drama* is too important a book to be past by with a mere note. It will be noticed authoritatively in a

later issue. (Boston: Houghton Mifflin Company, 1910. 320 p. $1.25.)

The making of source books has now reached the subject of sociology, and *Source book for social origins,* by Professor William I. Thomas of the University of Chicago, is both novel and exceptionally interesting. The selections are from writers of eminence and of authority among contemporary and modern scholars, and refer to the relation of society to geography and economic environment; to mental life and education; to invention and technology; to sex and marriage; to art; to magic, religion, and myth; and to social organization and the state. A number of very full supplementary bibliographies round out a volume of quite unusual suggestiveness and value. (Chicago: The Chicago University Press, 1909. 932 p. $4.77.)

Professor William J. Hale of the University of Michigan has made in his *Calculations of general chemistry* a book of value for the laboratory worker of a character sufficiently elementary to be used by students during their first year of chemical study. (New York: D. Van Nostrand Company, 1909. 174 p. $1.00.)

A new *American history* has been written by Professor J. A. James of Northwestern University, and Professor A. H. Sanford of La Crosse, Wisconsin, State Normal School. Their book has several elements of freshness about it, and problems of economic and industrial expansion are not neglected. The bibliographies are good and so are the illustrations. (New York: Charles Scribner's Sons, 1909. 565 p. $1.40.)

We called attention some months ago to the fact that the steady progress of agriculture as a school subject was being revealed in the multiplying of textbooks dealing with that topic. The last one to reach our desk is *Agriculture for common schools* by Martin L. Fisher and Fassett A. Cotton. Pupils in the upper grades of elementary schools can profitably use the book, which is simply and clearly written. (New York: Charles Scribner's Sons, 1909. 380 p. $1.00.)

An excellent general survey of the literature of Germany is contained in *A brief history of German literature* which Mr.

Priest of Princeton University has adapted from Gotthold Klee's *Grundzüge*. The volume is admirably adapted to text-book use, and contains in good proportion and with clear statement a setting out of the essential facts of the field which it covers. (New York: Charles Scribner's Sons, 1909. xii+ 366 p. $1.50.)

A thoroly good *College textbook of geology* is that by Professors Chamberlain and Salisbury of the University of Chicago. It is entirely modern, not only in its arrangement of topics, but in its treatment. The illustrations are especially good, well chosen, and clearly reproduced. We question a little the possibility of completing the course based in this volume in one-half of an academic year, which is what the authors have in mind. We should prefer to see a good full year put upon it, and no day of it need be wasted. (New York: Henry Holt & Co., 1909. 978 p. $3.50.)

Professor G. S. Callendar of Yale has made a book of readings for the use of students of history and economics, entitled *Economic history of the United States,* 1765-1860. The result is a very interesting collection of material which it would repay serious-minded American citizens and publicists to read with care. One of the greatest sources of waste in the United States is due to ignorance and neglect of what has already been said and done. (Boston: Ginn & Co., 1909. 820 p. $2.75.)

Henry Rutgers Marshall, whose important contributions to the literature of psychology are familiar to all students of that subject, has in his new book entitled *Consciousness* brought together the ripe result of his years of thinking on this fundamental topic. Mr. Marshall acknowledges his indebtedness to William James and to Stout. His obligation to them is surely for inspiration and stimulus only. His thinking is original and his presentation definite and persuasive. This is not the place to attempt a critical examination of what we believe to be a very important contribution to the literature of psychology. (The Macmillan Co., 1909. 683 p. $4.00.)

The latest report to be received from the office of the Director-General of Education in India contains a collection of

papers on the training of teachers in the United Kingdom, in Prussia, in America, and in Bombay. The sketch on the training of teachers in America seems to us very superficial, and to lack grasp on what is really being done in this country. The writer's visit to the United States was evidently too short to enable him to accomplish the admriable purpose which he had in mind. The other papers in the volume seem to us better done. (Calcutta: Government Printing Office, 1909. 145 p.)

A practical and simply written little book on sanitation is entitled *Primer of sanitation* by John W. Ritchie. Even children of tender years can understand the significance of the statements and illustrations contained in the book. (World Book Company, Yonkers, N. Y., 1909. 200 p. 60c.)

A new *Plane and spherical trigonometry* which is complete in contents, very well arranged, and admirably printed, is that by Levi L. Conant of the Worcester Polytechnic Institute. (New York: American Book Company, 1909. 222+80 p. $1.20.)

We can not quite see the use of the volume entitled *Representative college orations* by Professor Shurter of the University of Texas. These orations, so called, are the product of immature students, and are, so far as we can see, without a value commensurate with the importance given to them here. (New York: The Macmillan Co., 1909. 405 p. $1.25.)

The promise of American life, by Herbert Croly, is a serious and important book. It will repay reading, but it will, we think, provoke much dissent from many of its comments and conclusions. It is by no means a great book, but it is a worthy one. It deals, in a fashion rather informed than profound, with a number of important present-day tendencies. (New York: The Macmillan Company, 1909. 468 p. $2.00.)

In the series entitled *Masters of literature,* A. W. Evans has edited a volume entitled *Carlyle.* The introduction is well done, and the selections are thoroly characteristic of Carlyle's style and manner of thought. (London: George Bell & Sons, 1909. 379 p. 4s. 6d.)

Education through music is the title of a volume that teachers will find especially useful, by Professor Charles H. Farnsworth of Teachers College, Columbia University. Professor Farnsworth outlines the work in music for each of the several elementary years, and writes with genuine enthusiasm of his subject. (New York: The American Book Company, 1909. 208 p. $1.00.)

A great many readers have used the so-called *Hudson Shakespeare* during the past quarter of a century. The publishers are now bringing out a new and revised edition applying to the text of Shakespeare and its annotations are the results of recent scholarly criticism. The little volumes, each containing one play, are the best of their kind. The two before us are *The tempest* and *Hamlet.* (Ginn & Co., 1909. 50c. each.)

Edgett's *Exercises in geometry* is a well graded series of problems for students of plane geometry. (Boston: D. C. Heath & Co., 1909. 81 p.)

Hygiene for young people is the title of a book by Dr. A. P. Knight of Queens University, Kingston, Ontario. It is in all respects up to date and will be found useful in elementary school work. (New York: Charles E. Merrill Company, 1909. 204 p. 50c.)

A new volume to be added to the Riverside Literature series contains Washington's *Farewell address* and Webster's *First Bunker Hill oration,* both edited by Professor W. T. Foster of Bowdoin College. (Houghton Mifflin Company, 1909. 119 p. 25c.)

A readable series on religious topics, simple enough for general understanding, are contained in the series of *Modern religious problems.* The first four numbers are *The founding of the Church,* by Dr. Benjamin W. Bacon, *The fourth Gospel,* by Professor Ernest F. Scott, *Sin and its forgiveness,* by President Hyde, and the *Gospel of Jesus,* by George W. Knox. (Boston: Houghton Mifflin Company, 1909. 50c. each.)

We have already noticed the appearance in an attractive edition of the reprint of the "First Folio" Shakespeare, a

volume being given to each play. The first three volumes to reach us are *Antony and Cleopatra, Timon of Athens,* and *Titus Andronicus.* (New York: Thomas Y. Crowell & Co., 1909. 75c. each.)

Two additions to the important studies issuing from Teachers College, Columbia University, are *The legal status of rural high schools of the United States* by Edwin N. Snyder, and *The development of school support in colonial Massachusetts,* by George L. Jackson. Both studies admirably illustrate the practical result of applying best historical method to the study of these vitally important educational problems.

An attractive book for quiet reading is *The journal of a recluse,* translated from the original French. Neither the author's nor the translator's name is given. The book itself is the survey of a man's career, written in autobiographical style, and it is full of interest and suggestion. (New York: Thomas Y. Crowell & Co., 1909. 346 p. $1.25.)

In the series known as *Crowell's shorter French texts,* we have received a dozen admirable little volumes suitable for reading in schools. The texts are carefully made and well printed and bound. (New York: Thomas Y. Crowell & Co., 1909. 25c. each.)

Professor Manly of the University of Chicago has edited in one stout volume a collection of *Standard English prose,* chosen from the literature of the period between the Twelfth Century and the Nineteenth. The book has a manifest educational use. (Boston: Ginn & Co., 1909. 545 p. $1.50.)

Professor Goodnow of Columbia University, who more than any other man has developed the science and study of administrative law in the United States, has recently issued an admirable book entitled *Municipal government.* Both the theoretical and practical aspects of urban life and control are here set out by the first of American authorities on the subject. (New York: The Century Co., 1909. 401 p. $3.00.)

It is pleasant to see an edition of Ben Jonson's *English grammar* in a form which students of English can readily obtain and use. The book seems quaint enough in this day, but,

if only for its quotations, it would be valuable. This edition is edited by Miss Waite of Wellesley College. (New York: Sturgis & Walton Co., 1909. 150 p. 75c.)

The third volume of Professor Spingarn's *Critical essays of the seventeenth century* completes his important undertaking, which is a credit to American scholarship. (Oxford University Press, 1909. 376 p. $1.75.)

A very charming fruit of the recent travels in Sicily of Mr. Will S. Monroe is to be found in his *Sicily: the garden of the Mediterranean,* which is attractively written and delightfully illustrated. (Boston: L. C. Page & Co., 1909. 404 p. $3.00.)

The passing of Dr. Harris lends special point to the appearance of a careful volume on Hegel's *Educational theory and practise.* No one so well as he could expound this epoch-making theory and show its relations to the practise and every-day task of the schoolroom. In this book, however, which is written by Miss MacKenzie of the University of Cardiff, there will be found an admirable setting forth in simple language of Hegel's vitally important teachings. (Syracuse: C. W. Bardeen, 1909. 214p. $1.00.)

Professor Small of the University of Chicago has made a new and important contribution to the literature of the social sciences in his *The Cameralists: the pioneer of German social polity.* Too little is known of these men, even by students of social science, and we welcome Professor Small's exposition of their teachings. (Chicago: University of Chicago Press, 1909. 606 p. $3.00.)

Whatever Professor Patten of the University of Pennsylvania writes is worth while reading. A vigorous essay, entitled *Product and climax,* has just come from his pen, which will force a good deal of hard thinking, if it is read with attention. (New York: B. W. Huebsch, 1909. 68 p. 50c.)

Bacon's *German grammar* is a capital adaptation of a well known German textbook, and may be recommended to teachers of elementary German. The simple stories selected for use in connection with grammatical drill are excellent. (Boston: Allyn & Bacon, 1909. 342+xlii p. $1.25.)

The Abbé Klein has made a most interesting and compli-

mentary book about America in his *L'Amérique de Demain.* Few of our foreign visitors have seen so wisely or so justly as this distinguished ecclesiastic. (Paris: Librairie Plon, 1910. 320 p. 3f.50.)

Professor Bennett of Cornell, who has already done so much for Latin teaching, has made a book entitled *First year Latin* which is thoroly modern. (Boston: Allyn & Bacon, 1909. 280 p. $1.00.)

An addition to the numerous rhetoric textbooks for use in high schools and colleges is *Paragraph writing,* by Professor Scott of the University of Michigan and Professor Denny of the Ohio State University. (Boston: Allyn & Bacon, 1909. 468 p. $1.25.)

The Clarendon Press has printed a charming edition of two selections from De Quincey, *Spanish military nun* and *The revolt of the Tartars.* (Oxford: Clarendon Press, 1909. 144 p. 1s.)

Elementary cabinet work by Frank S. Selden of Valley City, N. D., is a thoroly practical book for manual training classes. Teachers will get some valuable hints from it. (Chicago: Rand McNally Company, 1909. 278 p. $1.25.)

Professor W. W. Folwell, whose long and honorable association with the University of Minneapolis gained him so great affection and respect, has brought together under the title *University addresses* four important utterances of his in years past. They are well worth reproducing and well worth studying. (Minneapolis: The H. W. Wilson Company, 1909. 224 p.)

Professor Charles Sears Baldwin of Yale is a prolific and always helpful writer in his chosen field. We welcome particularly his admirable *Composition, oral and written.* A careful examination of this textbook reveals excellent arrangement, capitally chosen illustrative material, and sound sense. (New York: Longmans, Green & Co., 1909. 365 p. $1.20.)

Elementary chemistry by Hollis Godfrey is a well made book with few novel characteristics unless it be the excellently chosen illustrations. (New York: Longmans, Green & Co., 1909. 456 p. $1.10.)

Physiology of man and other animals by Miss Anne Moore is really an excellently arranged and simple body of elementary material in the science of physiology. We do not remember to have seen a better or more useful book for beginners. (New York: Henry Holt & Co., 1909. 212 p. 80c.)

Julian Riebera, whose name is familiar to readers of contemporary Spanish literature, has published two interesting little volumes under the title *La Superstición Pedagógica.* His chapters reveal how much the reflective Spaniard who observes educational tendencies has in common with the American student of similar type. (Madrid: E. Maestre, 1910. 232, 258 p. 6P.)

The engineers are beginning to have their day in the rapidly growing number of textbooks for elementary use. The last one to reach us is *Textbook of hydraulics* by Assistant Professor Russell of the Massachusetts Institute of Technology. It is arranged rather for students than for practising engineers. (New York: Henry Holt & Co., 1909. 183 p. $2.50.)

Professor Wilder of Smith College has chosen the inviting title *The history of the human body* for a setting forth of the results of modern research in anatomy and embryology so far as they relate to the structure of the human form. (New York: Henry Holt & Co., 1909. 573 p. $3.00.)

A more than usually attractive book is *A literary history of Rome* by J. Wight Duff of Pembroke College, Oxford. The chapters on Cicero and oratory and on the elegiac poets are particularly interesting. (London: T. Fisher Unwin, 695 p. 12s. 6d.)

Professor von Domaszewiski of Heidelberg has recently published in two volumes an exceptionally valuable *Geschichte der Römischen Kaiser.* He has used the latest available material and has told the story of the great Roman emperors admirably. Particularly to be commended are the capital reproductions of the best known busts of the emperors. (Leipsic: Quelle & Meyer, 1909. 324, 326 p. 9M.)

Miss Jessie H. Bancroft, whose excellent work for physical education is well known, has brought together a very complete manual of various childish games and sports in her *Games for*

the playground, home, school and gymnasium. (New York: The Macmillan Company, 1909. 456 p. $1.50.)

In the *Principles of soil management,* Professors Lyon and Fippin of Cornell University have written a book that is complete, but too technical, we fear, for any but pretty serious-minded students. (New York: The Macmillan Company, 1909. 531 p. $1.75.)

Mr. Benjamin Rand of Harvard University has brought together selections illustrating ethics from Socrates to Martineau in his *Classical moralists.* The book will be found valuable in connection with college classes in ethics. (Boston: Houghton Mifflin Company, 1909. 797 p. $3.00.)

Teachers both in city and country will find helpful suggestions in *The school garden book,* by Messrs. Weed and Emerson. (New York: Charles Scribner's Sons, 1909. 320 p. $1.25.)

Masters of the English novel is a series of studies of principles and personalities by Richard Burton. Some of his critical paragraphs, particularly in his chapters on Jane Austen and Trollope, are strikingly suggestive. (New York: Henry Holt & Co., 1909. 357 p. $1.25.)

The third and concluding volume of Jusserand's *Literary history of the English people* covers the Shakespearean epoch and brings to an end a truly monumental piece of work. The entire work can only be described as absolutely indispensable. (New York: G. P. Putnam's Sons, 1909. 629 p. $3.50 net.)

At attractive book of African travel is *The gateway to the Sahara* by Charles W. Furlong. (New York: Charles Scribner's Sons, 1909. 306 p. $2.50.)

The Rev. Francis B. Hornbrooke has essayed in 234 pages an interpretation of Browning's *The Ring and the book.* (Boston: Little, Brown & Co., 1909. 234 p. $1.50.)

Mr. Ripley Hitchcock has edited, in his *Decisive battles of America,* a collection of interesting military descriptions. (New York: Harper & Brothers, 1909. 397 p. $1.50.)

Mr. Bardeen's *Manual of common school law,* which has been a familiar and practically indispensable reference book for years in the State of New York, has now been revised and

rewritten and brought down to date. It is not mere rhetoric to say that the book is invaluable, and that school officers and administrators everywhere will find it desirable to have a copy of it on their desks. (Syracuse: C. W. Bardeen, 1910. 470 p. $1.50 net.)

We can not but note with approval the growing interest in international law and the satisfactory reception accorded to good textbooks in that field. We welcome the fifth edition of *International law* by Messrs. George G. Wilson and George F. Tucker. The book is suitable for use in colleges. The appendices are very valuable. (New York: Silver, Burdett & Co., 1910. 505 p. $2.50.)

A new and enlarged edition of the well-known and authoritative book entitled *Punishment and reformation* by Frederick H. Wines, has just come from the press. While the book deals with the special aspect of the moral and the social problem, yet there is much in it that is suggestive and informing for students of general educational movements. (New York: Thomas Y. Crowell & Co., 1910. 387 p. $1.75.)

A *Plane trigonometry* that is well arranged, clearly printed, and abundant in problems of real significance and value has been written by Edward R. Robbins of the Penn Charter School in Philadelphia. (American Book Co., 1910. 166 p. 60c.)

Three easy reading books for young students of French and German are new and appropriately edited editions of Mairet's *La petite Princesse,* George Sand's *Le Meunier d'Angibault,* and Ries's *Easy German stories.* (New York: American Book Co., 1910. 154 p., 35c.; 176 p., 40c.; 183 p., 35c.)

Stories from Greek history by Louise Diman puts some of the great classic tales of the race within the easy understanding of school children. (New York: Charles E. Merrill Co., 1910. 236 p. 40c.)